American River Snorkel Survey 2005
Data Report

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Introduction

Under a grant from the U.S. Fish and Wildlife Service, the Fishery Foundation of California conducted a snorkel survey of the Lower American River (LAR) from March to August, 2005. The survey assesses the biological results and effectiveness of actions under the Central Valley Project Improvement Act {Section 3406(b) (16)}. In particular, this survey monitored juvenile Chinook populations and summer-time adult steelhead populations within the LAR as part of a comprehensive assessment program to monitor fish and wildlife resources of the Central Valley. The survey objectives included (1) determine how juvenile Chinook salmon (*O. tshawytscha*) and steelhead (O. mykiss) use the LAR from March through August; and (2) determine how juvenile salmonids use various river habitats.

Jackson (1992) conducted snorkel surveys of the LAR from 1989 to 1991. He focused on 15 macrohabitat polygons. His objective was to determine microhabitat preferences of juvenile salmon. He concluded that microhabitat use of each macrohabitat polygon was unique because of the different morphology and habitat availability of each polygon. He also found much greater numbers of young salmon in years with higher flows 105 m^3/s (3600 cfs) versus low flows 9.9 m^3/s (340 cfs). Based on this and other studies (Water Forum 2001, Jones and Stokes 2002) there appears to be a general consensus that flow and water temperature are the limiting factors for salmon and steelhead smolt production in the LAR.

These recent findings also suggest that lower flows provide insufficient habitat for rearing young salmon and steelhead in the LAR. However, uncertainty remains as to what flows are optimal for rearing and migration of salmonids, as well as other aspects of the biology of salmon and steelhead in the LAR (Williams 2000). The 2005 snorkel survey is yet another step toward addressing these questions.

The snorkeling procedure employed in the 2005 survey is similar to the procedure used in the 2003 and 2004 surveys. As in the previous years, the 2005 sampling locations were composed of an array of two-dimensional units or polygons representing habitats found throughout the river. If salmonid use can be related to habitat conditions in the polygons and habitat conditions can be related to flow, then streamflow can be related to the value of habitat in the LAR. If habitat use can be translated into habitat value, then habitat use patterns may help in defining habitat restoration needs and alternatives. Williams (1999) related that defining habitat for such purposes has not been satisfactorily resolved, especially in large rivers such as the LAR.

As in 2003 and 2004, the 2005 snorkel survey offers the potential of obtaining relative spatial and temporal densities and distributions of various life stages of juvenile salmonids in the LAR.

Fish Community

The LAR between Nimbus Dam and the mouth at the Sacramento River is an important spawning and rearing habitat for fall-run Chinook salmon(*O. tshawytscha*), steelhead trout (O. mykiss), American shad *(Alosa sapidissima)*, and many native fish species including Sacramento splittail (*Pogonichthys macrolepidotus)*, Sacramento pikeminnow (*Ptychocheilus grandis*), Sacramento sucker (*Catostomus occidentalis),* tule perch (*Hysterocarpus traski),* and Pacific

lamprey *(Lampetra tridentata).* In addition the LAR is seasonally important habitat for adult striped bass *(Morone saxatilis)* and American Shad that migrate upstream into the LAR from the Sacramento River and Bay-Delta estuary. The steelhead trout and Sacramento splittail have been federally listed as threatened.

Many of these fish species use the aquatic habitats of the LAR for spawning, rearing, and feeding. Gravel riffles and runs provide spawning habitat for many species including salmon and steelhead, which lay their eggs in gravel spawning beds in higher gradient areas of the river from fall through spring. Shallow, low gradient areas of the lower river are spawning habitat for splittail and rearing habitat for many of the other locally important fish species.

The steelhead population of the Central Valley ecological unit includes steelhead from the LAR. Steelhead trout are most abundant in the river in winter and spring. Adult steelhead may be found in the river during any month of the year but primarily migrate into the river to spawn in the winter and spring. The native steelhead were a spring-run, which migrated into the river in spring and then remained over summer and fall to spawn the next winter or spring. Young steelhead hatch in late winter and spring, and rear in the river until the following winter and spring before migrating downstream to the ocean as smolts. Some may remain in the river a year or more before migrating to the ocean.

Adult fall-run Chinook salmon begin migrating into the LAR in summer, gradually peaking in abundance in October and November where spawning occurs in gravel beds of the upper 10 miles of the LAR. The run supports an extensive recreational fishery from late spring through the fall.

Natural production of salmon offspring is supplemented by smolts produced at the Nimbus hatchery, which are transported by truck and released into San Francisco Bay. In addition, the Nimbus hatchery is also responsible for the release of over 400,000 steelhead smolts into San Francisco Bay.

Lower American River Study Area

Location

The 2005 snorkel survey was conducted at 9 locations in the LAR between Watt Avenue and Nimbus Dam at river mile 23. These locations represent a variety of habitat conditions in various reaches of the LAR.

Figure 1. Year 2005 sampling locations the Lower American River.

We divided the LAR into reaches per Snider et al. (1992), who divided the river based on geomorphology and hydraulic criteria. Subreaches for the upper river (Snider et al.'s Reach 3) were broken out by bar complex simply because the parkway facilities are commonly referred to in this format.

Methods

Survey Design

Snorkel surveys were conducted twice per month from March through August 2005. Surveys were conducted at 9 sampling locations (Figure 1) approximately every two miles over the lower 23 miles of the LAR. Surveys were conducted over a period of two to three days.

Sampling locations were chosen to be representative of habitat in the various reaches of the river and to represent the broad array of physical habitat in the LAR. Sampling locations were chosen systematically to represent the longitudinal distribution of fish in the river through the survey period. More sampling locations were chosen in the upper river because this area is known to be the primary spawning and rearing habitat with a greater gradient and diversity of habitat. Choice

of sampling locations was influenced to some degree by accessibility, especially in the lower river where access was limited.

At each of the sampling locations the available habitat area was visually surveyed and representative habitat units designated as sampling units, or polygons. The polygons were laid out as two-dimensional features and called polygons (because of their varying sizes and shapes). Polygons varied in size from 30 to 150 feet in length and 6 to 10 feet in width. Polygon dimensions differed as a function of homogeneity of the habitat within the sampling location. For example mainstem run polygons were generally 100-150 feet in length because habitat varied little in large runs and pools of the main river channel. Shoreline and side channels polygons were smaller, varying in size from 30 to 100 feet in length, because variability in habitat was greater. In designating polygons we followed the general approach of Thomas and Bovee (1993) and Kocik and Ferreri (1988). According to these researchers polygons (they use the term cells) are discrete functional habitat units having a consistent range of microhabitat variables (depth, velocity, substrate, and cover). The functional habitat unit concept allows a flexible approach to evaluating habitat and determining seasonal habitat use patterns at a scale that can be readily visualized and is understandable. For example, shallow shoreline riffle margins with uniform cover were one common type of polygon; while mainstem runs with consistent depth and substrate were another. Other common types were backwater and riffle/pool margins with and without cover, and deep pool margins or clay banks with and without cover. In most cases polygons had unique qualities with obvious differences from other polygons among and within sampling locations, but polygons could be categorized into one general type or another (e.g., shoreline, sidechannel, riffle, and with or without cover).

The number of units chosen varied directly with the diversity of habitat at the sampling location. For example, sampling locations with islands and side channels were allocated more polygons. Despite some sampling locations having nearly 20 units, most units within a sampling location had some unique habitat features or conditions that differentiated them from other units.

Polygons were chosen from the available array of riffles, pools, runs/glides, and backwaters following mesohabitat classification systems in the standard literature (Bisson et al. 1981). At each sampling location, sampling polygons were designated from as many mesohabitat types as possible. Given the high variability in habitat available among and within possible sampling locations, the final survey array has some degree of randomness despite being discretely chosen. No map of habitat at the polygon level was available for the river from which to choose sampling locations or polygons in a random or systematic fashion.

Not all polygons were sampled in each survey for various reasons. In some cases under high flows it was not possible to sample all polygons. Some polygons could no longer be sampled in low flow periods. In some cases other polygons were added or substituted. Generally, for each sampling period, surveys were conducted at most of the designated sampling polygons at each sampling location.

Sampling locations were generally accessed by vehicle, and then polygons were reached by foot or by swimming. During high flow periods, some polygons could not be sampled because of the danger of swimming across the river.

Sampling Technique

Snorkeling was conducted similar to other snorkel surveys (Edmundson et al 1968; Hankin and Reeves 1988, Jackson 1992). One snorkeler generally sampled each polygon. At times a second snorkeler followed the data collector for the purposes of observing, training, or quality assurance checking. For near shore polygons, the diver proceeded upstream against the current. In eddies, the diver proceeded against the current. In faster water the diver often had to pull along the shoreline using rocks and brush to hold or gain position. Deeper and center stream polygons were sampled by the diver proceeding downstream with the current. Swimming with the current in deeper water brought about less avoidance than appeared to be the case when swimming downstream in shallow water. It also appeared to be effective (at least in terms of approaching large wary fish) because of the general high rate of speed when moving over the deeper waters of the main channel of the river.

Fish were identified, counted, and sized as the diver proceeded up or down the sampling polygon. Typically, fish were observed while swimming upstream along shore either six feet from shore (velocity permitting) or directly along shore allowing upstream and offshore viewing. Care was taken to observe and count fish just once by passing fish and allowing them to escape downstream of the diver. Some counts were made as fish escaped past the diver, but generally divers were able to observe fish under normal behavioral conditions before fish were passed or escaped downstream past the diver. Generally, fish escaped when approached by passing inshore or offshore past the divers and going downstream. Some fish, especially large fish, escaped by heading offshore to deeper water. Some, especially schooling fish like tule perch and Chinook salmon escaped upstream, and for these the divers had to ensure they were not counted twice. In shallow waters along shorelines, it was nearly impossible to make accurate counts if divers approached from upstream, because of sediment disturbance and higher speed involved, as well as the orientation of the fish in the current toward the approaching diver. For these same reasons, polygons were sampled sequentially from downstream to upstream.

Data Collection

Divers recorded their observations on PVC slates attached to their forearms. Numbers of fish were recorded by species and size group as the diver proceeded through the polygon (Table 1). Individual concentrations of fish were recorded along with habitat conditions associated with the concentration. Habitat conditions of the polygon were recorded including depth, velocity, substrate, and cover. All sampling locations were surveyed twice each month.

Table 1. Fish length codes and sizes for spring 2005 juvenile salmonid sampling on the Lower American River.

Length Code	Size (mm)
1	20-40
2	40-60
3	60-80
4	80-100
5	100-200
6	200-300
7	300-400
8	400-600
9	>600

Fish were identified to species following keys in Moyle (2002). Larvae and early juvenile suckers and minnows (principally pikeminnow) were not counted our included because of their extreme abundance and widespread distribution beginning in spring. Only when they reached approximately 20-40 mm in early summer and could they be identified to species and thus included in the survey data.

Temperature was recorded with thermometers at each polygon. Selected temperatures were recorded within polygons if divers thought temperature gradients were affecting fish distribution. Generally, temperature varied little among all the sampling locations because of the relatively high flows especially in late spring and summer. Temperature variability within sampling locations was noticeable on warm afternoons at some sampling locations with backwaters exposed to the sun.

Flow data were obtained from the California Data Exchange Center (http://cdec.water.ca.gov/riv_flows.html). Additional temperature data was obtained from the United States Geological Survey (http://waterdata.usgs.gov/nwis/qw).

Data Processing

Data were transferred from slates to standard field "write-in-the-rain" data sheets. From data sheets, data were transferred directly to Microsoft Excel spreadsheets. All tables and charts were created in Microsoft Excel.

Results

River Flows and Stage Heights

River flows were relatively high in mid March ranging from 3,000-8,000 cfs, and increased through May to 5,000-26,000 cfs. Streamflow decreased in late June to 9,000 cfs and then dropped sharply to around 3,600 (Figure 2).

During high flow events the flood plain located in the lower reach of the American River is inundated with water and provide valuable habitat for salmonids. The pulse coupled with high water releases in the Sacramento River caused the stage height in the LAR, measured at Fair Oaks gauging station in mid May, to rise by over seven feet. The effect of this higher stage was to inundate the lower river flood plain from Watt Avenue to the mouth.

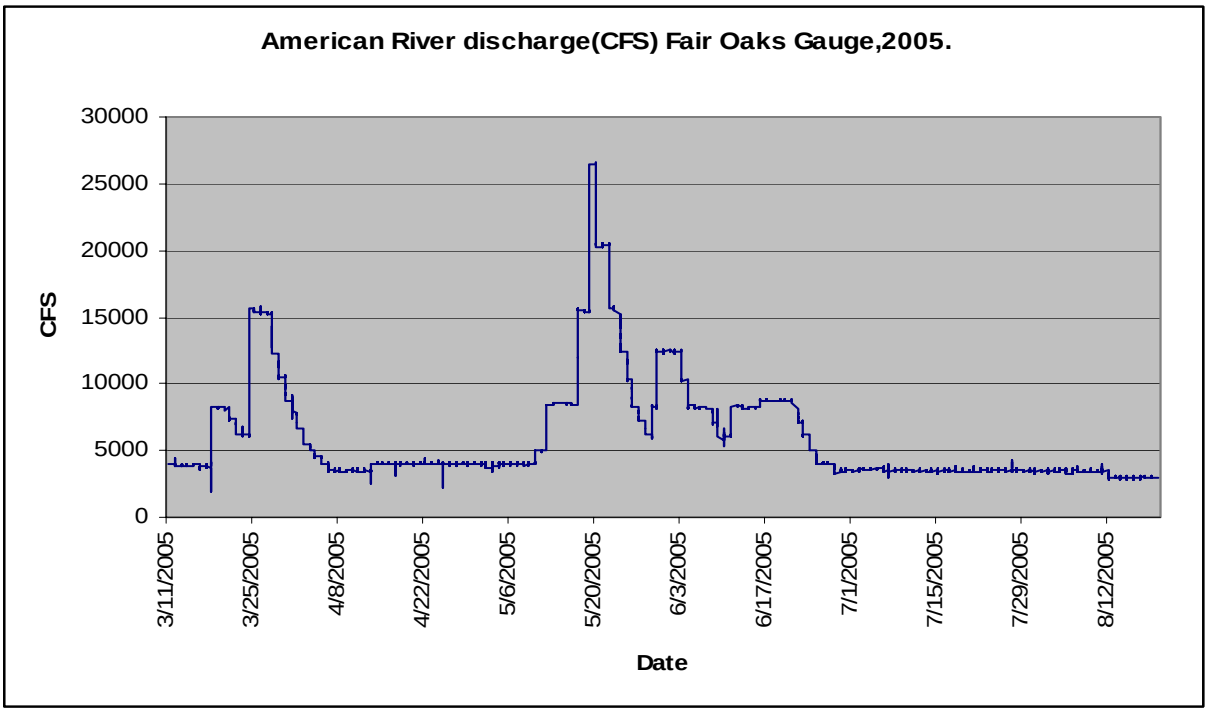

Figure 2. American River Streamflow for 2005 (CDEC, Fair Oaks Gauge).

Water Temperatures

Divers recorded temperature at each sampling polygon during each survey. During low flow periods the recorded temperatures varied as much as 5 °C between the swift flowing center transects and the warmer, shallower backwater pools. When river flows were at their highest the longitudinal river temperatures across all sampling locations varied as little as 1 °C.

The flows in the LAR are controlled by the Bureau of Reclamation for water storage, flood control and recreation. In the upper reach the temperature of the water released from Nimbus Dam remains suitable for trout and salmon for most of the sampling period. Moving

downstream into the lower reach where the river begins to flatten out and meander, the temperature rises in the slow currents. Maximum daily water temperature was 11-14°C in early March. In late March and early April maximum water temperature rose to the 12-16°C range. By summer, water temperature ranged from 15.5 - 18°C (Figure 3). Elevated temperatures limit the time that salmon and steelhead utilize the lowest reaches of the American River for rearing and may help explain the rapid decline in salmonid densities in May through July.

High flows are vital in keeping the temperature of the LAR in a suitable range for salmonids especially in the lower reach where the low channel gradient allows the water temperature to rise above the critical level preferred by salmon and steelhead.

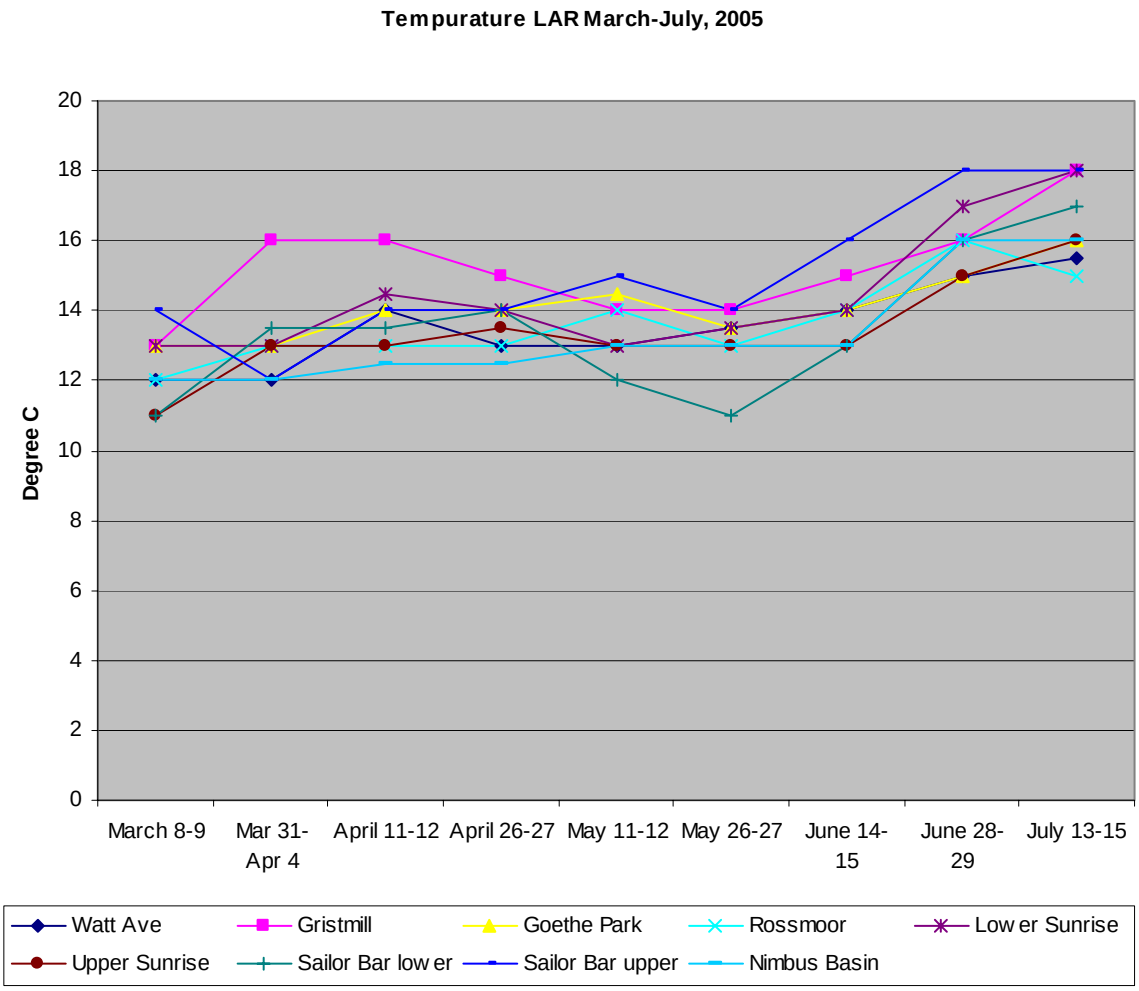

Figure 3. Average temperatures measured at nine sampling locations on the American River, 2005.

Species and Life Stages

During the snorkel surveys divers commonly observed Chinook salmon and Steelhead trout as adults, yearlings, and young of the year.

Chinook Salmon

Chinook young were observed in all surveys from March 8 through July 15. Density of salmon juveniles peaked in late March at 607.4 per 100 square feet. Most of the young salmon observed were fry (20-40 mm) or fingerlings (40-60 mm) (Figure 4) (Appendix A). Number of fry observed peaked in late March. However, the number of fingerlings observed peaked earlier in early March. After the initial sharp decline in density in late April, densities continued to decline through July. Only two Chinook greater than 600mm were observed during the 2005 survey (Figure 5).

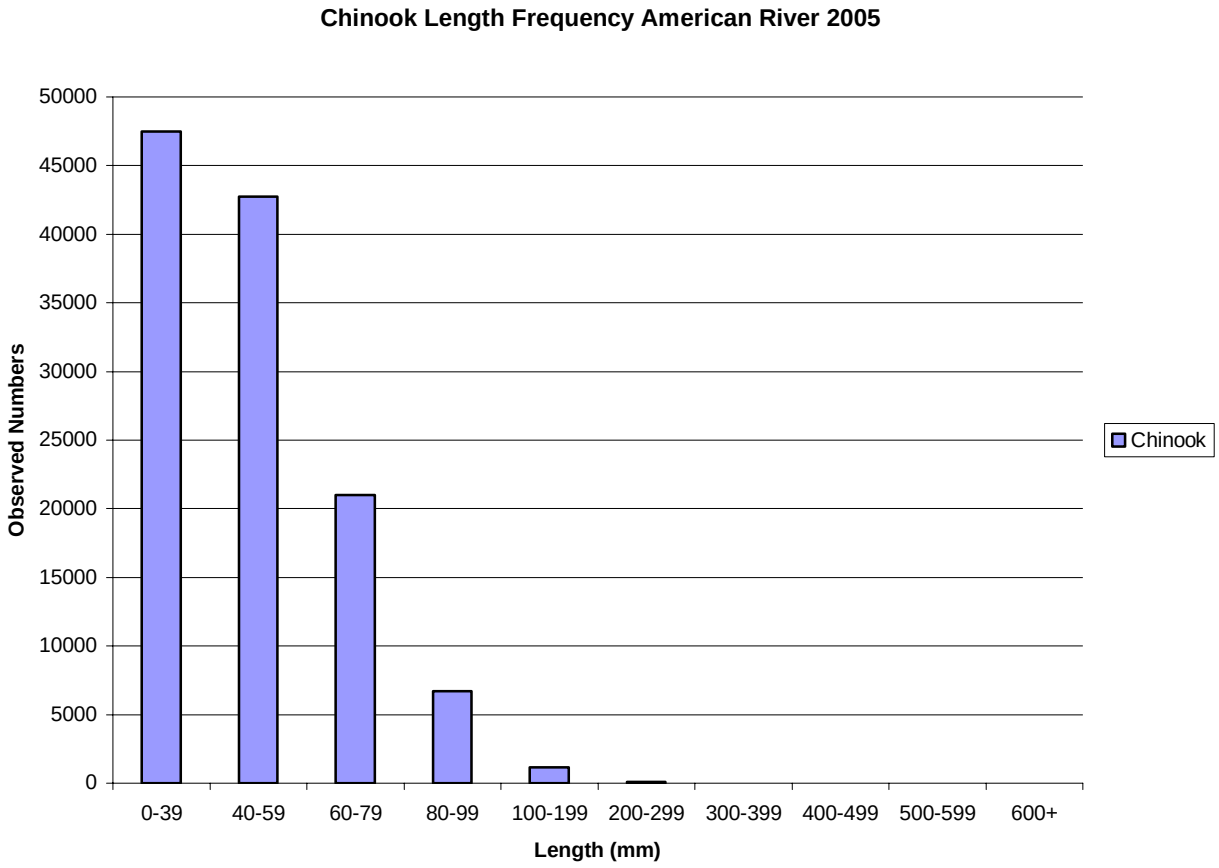

Figure 4. Length frequency distribution of the total observed juvenile Chinook salmon in the 2005 American River snorkel surveys.

Steelhead

Juvenile steelhead were commonly observed in polygons with shallow riffle habitat which is better at excluding predators that prefer pools such as striped bass. Fry steelhead began to appear in early March at the Upper Sunrise and Lower Sailor sampling locations. By mid April they were found at all sampling locations. Density of steelhead peaked in late April. In early May the density and numbers of steelhead fry observed began to decline although they were still observed at all sampling locations (Figure 5). Young steelhead density peaked in late April at 27.2/100ft^2. By early May, overall steelhead density began a steady decline through the remainder of the survey period. Most of the young steelhead observed were fry (20-40 mm), fingerlings (40-60 mm), and smolts (60-79 mm). The bulk of the remainder were 80-300 mm in length. Only ten steelhead greater than 400 mm were observed during the 2005 snorkel survey (Figure 6) (Appendix A).

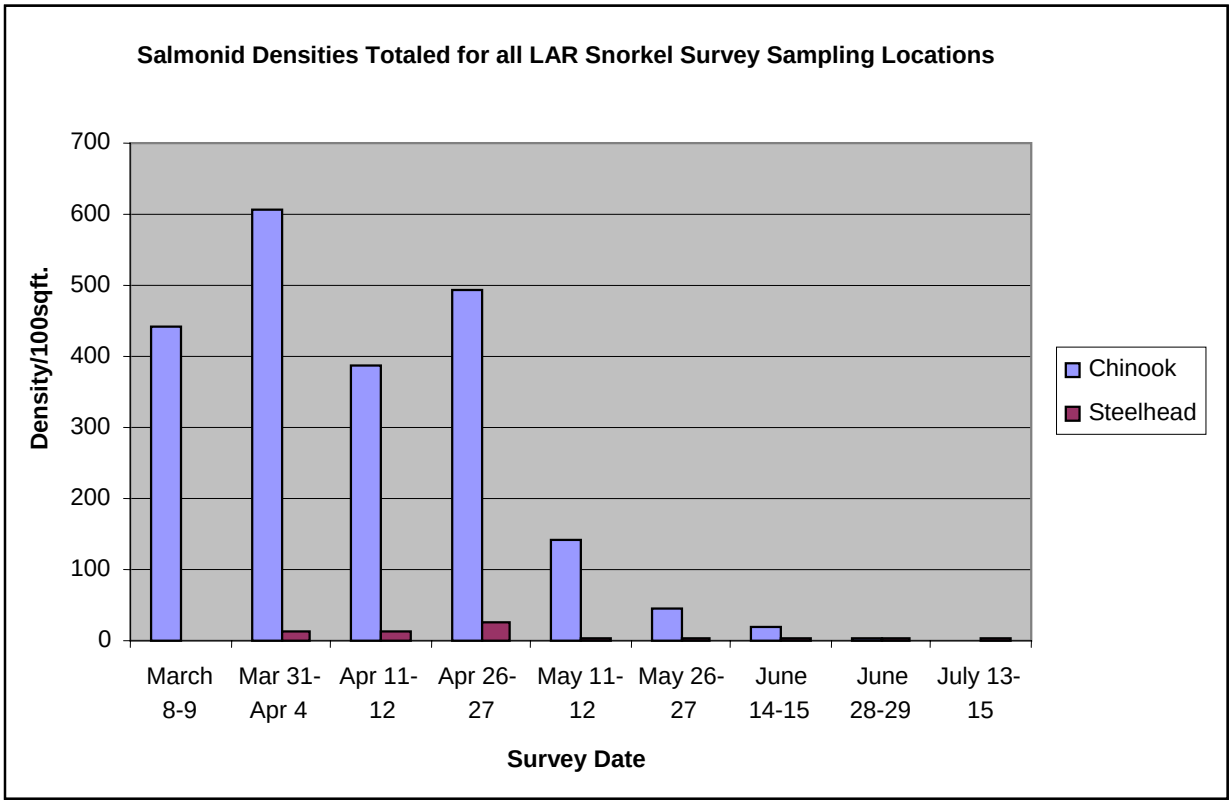

Figure 5. Bi-monthly salmonid densities averaged for all sampling locations for snorkel surveys of the American River, 2005.

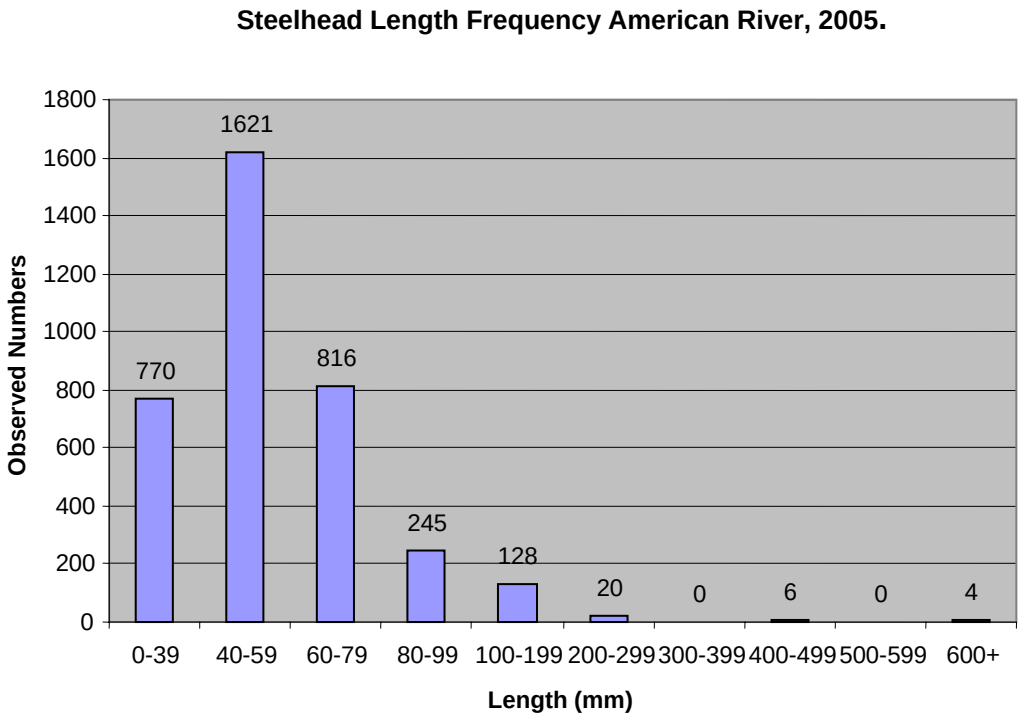

Figure 6. Length frequency distribution of the total observed steelhead in the 2005 American River snorkel surveys.

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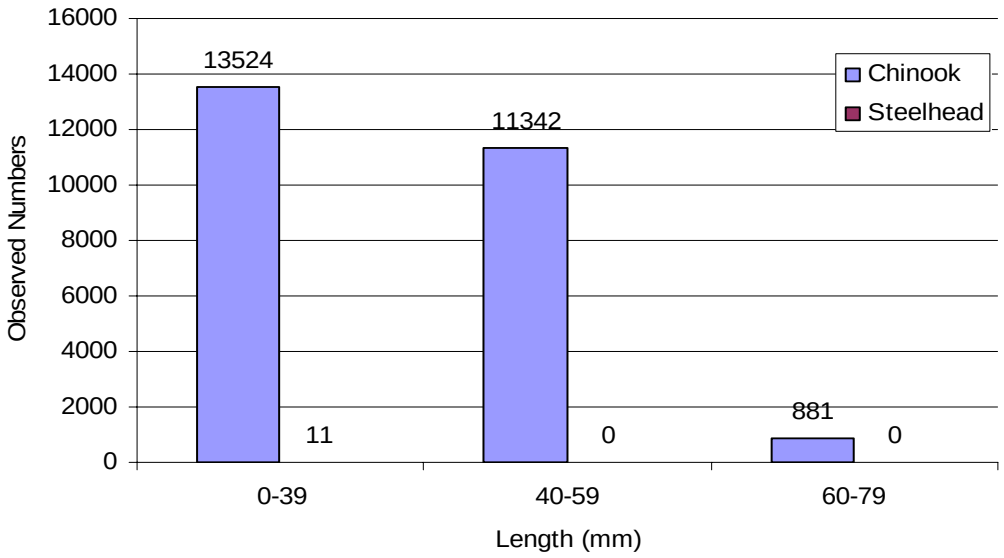
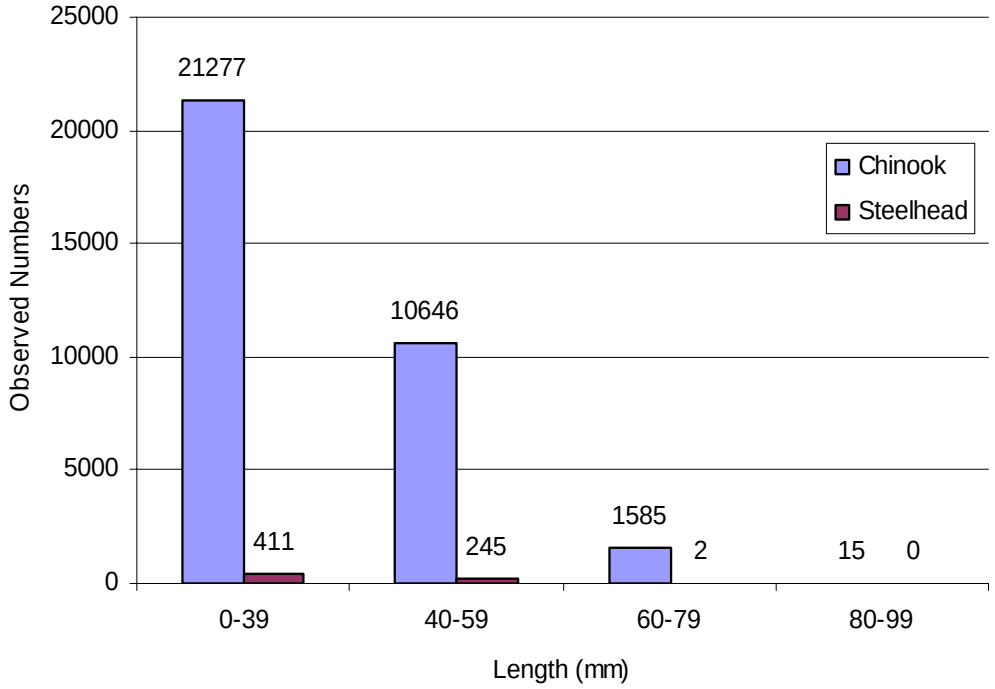
Appendix A: Length Frequency Charts

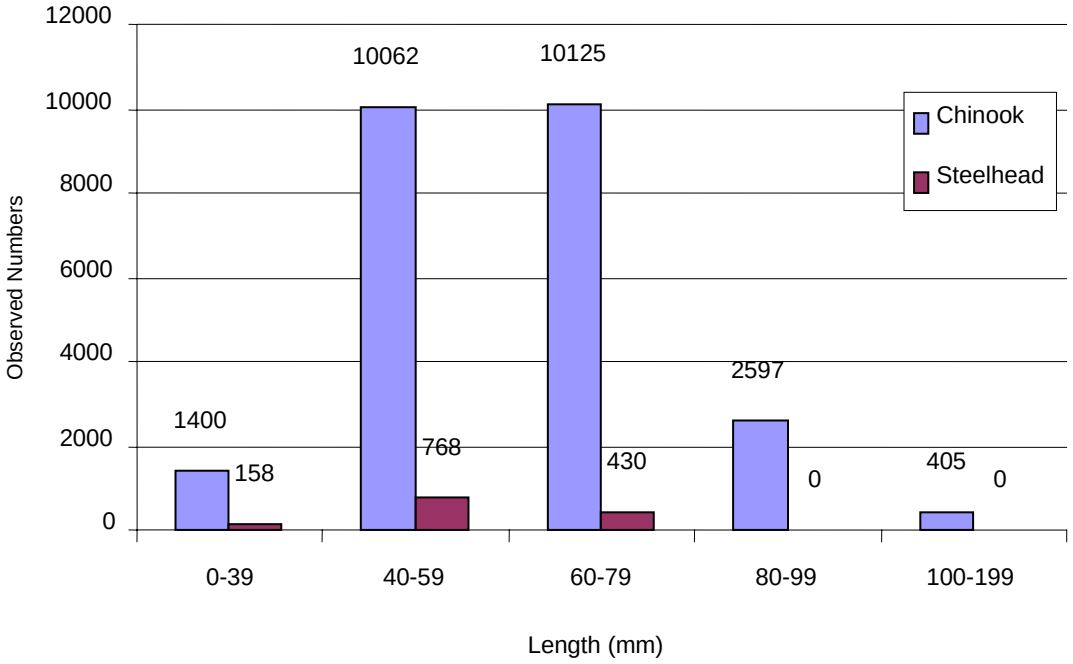
Salmonid Length Frequency Averaged for all Sampling Locations March 8-9, 2005



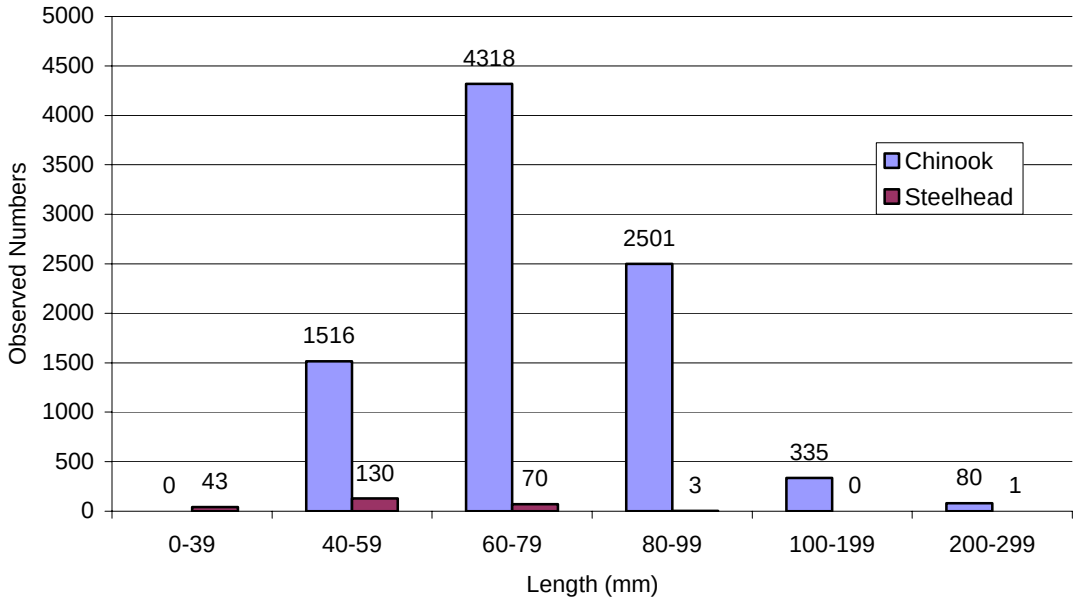
Salmonid Length Frequencies Averaged for all Sampling Locations March 31-April 1, 2005.



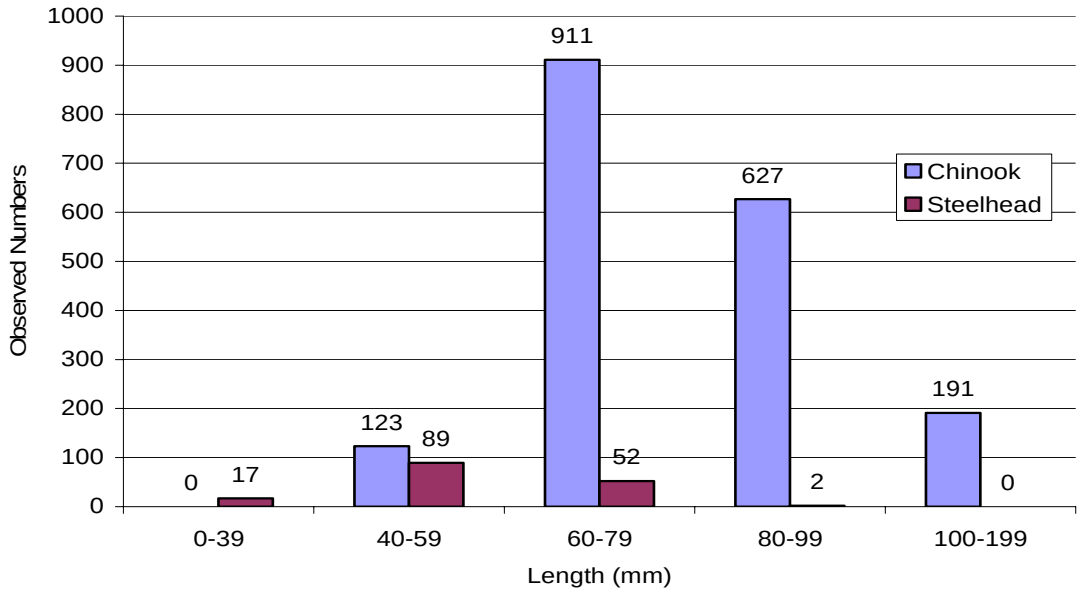
Salmonid Length Frequencies Averaged for all Sampling Locations, April 26-27, 2005



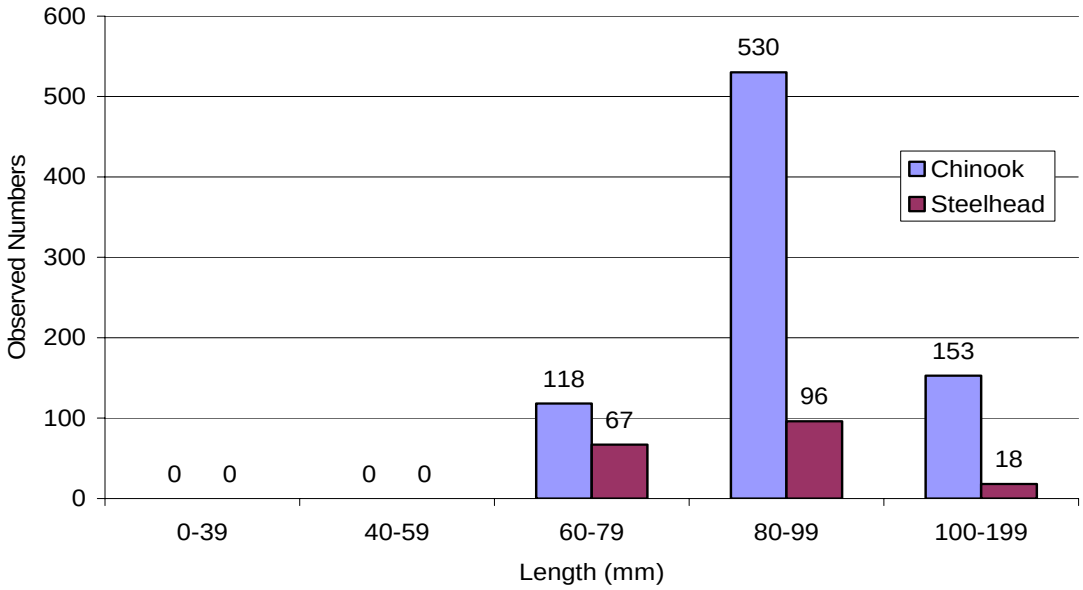
Salmonid Length Frequencies Averaged for all Sampling Locations,l May 11-12, 2005



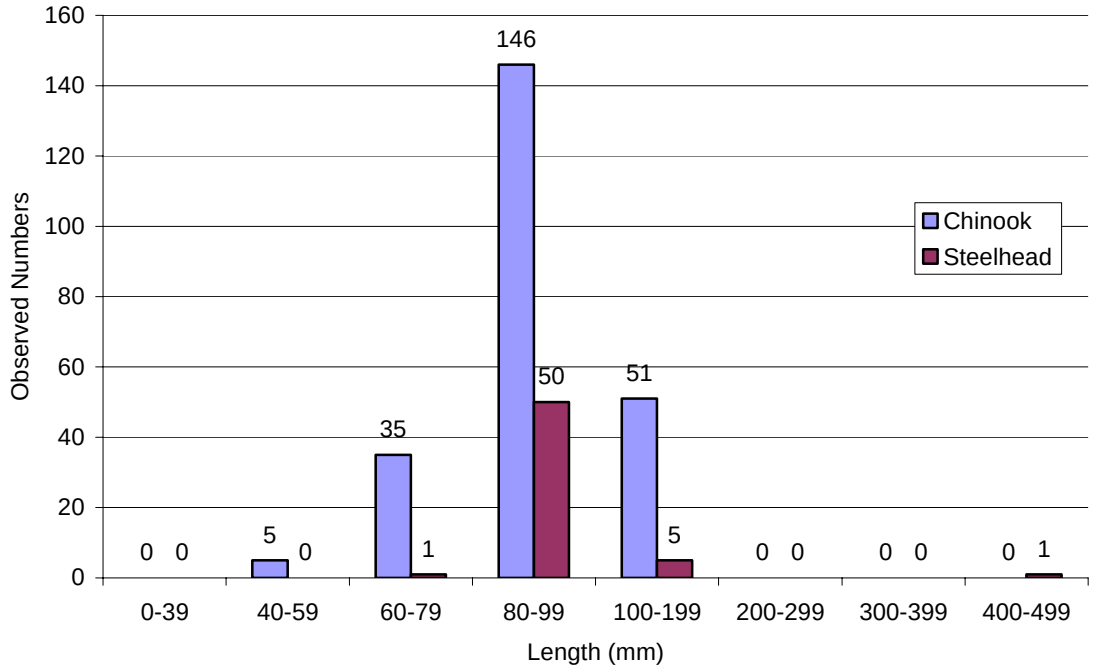
Salmonid Length Frequencies Averaged for all Sample Locations, May 26-27, 2005



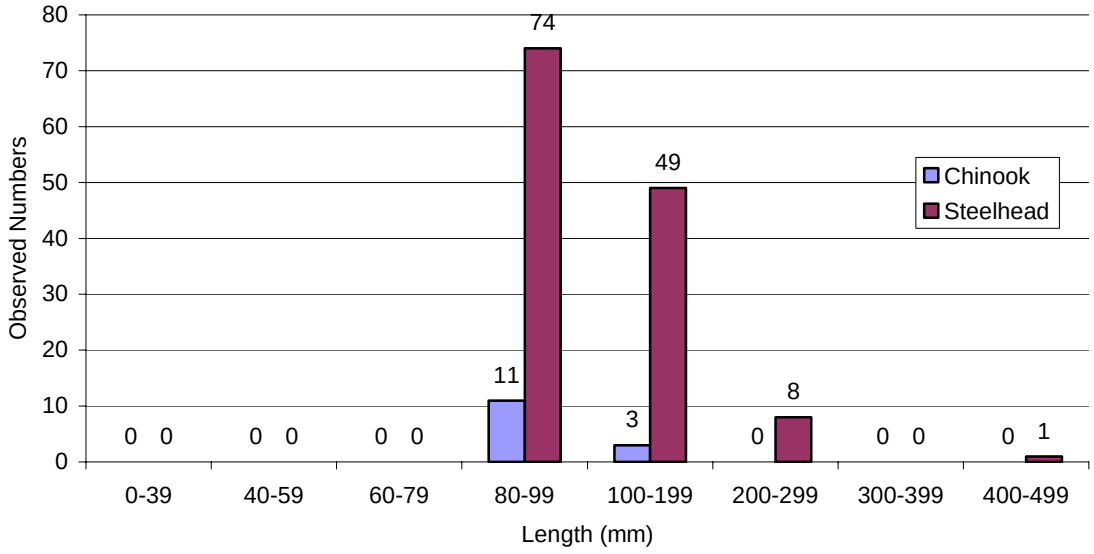
Salmonid Length Frequencies Averaged for all Sampling Locations. June 14-15, 2005



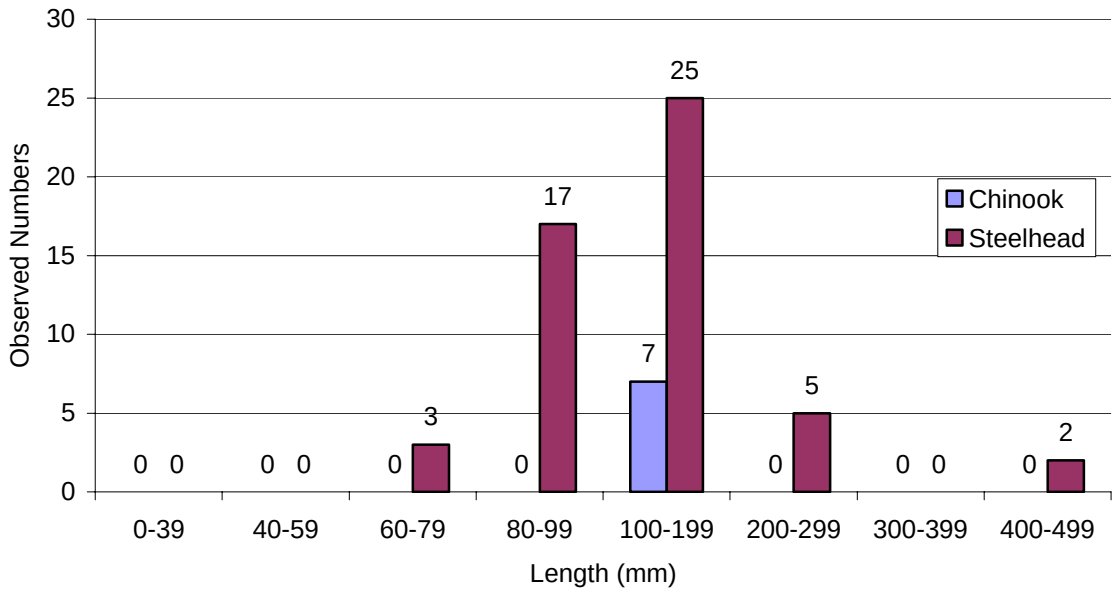
Salmonid Length Frequencies Averaged for all Sampling Locations, June 28-29 2005



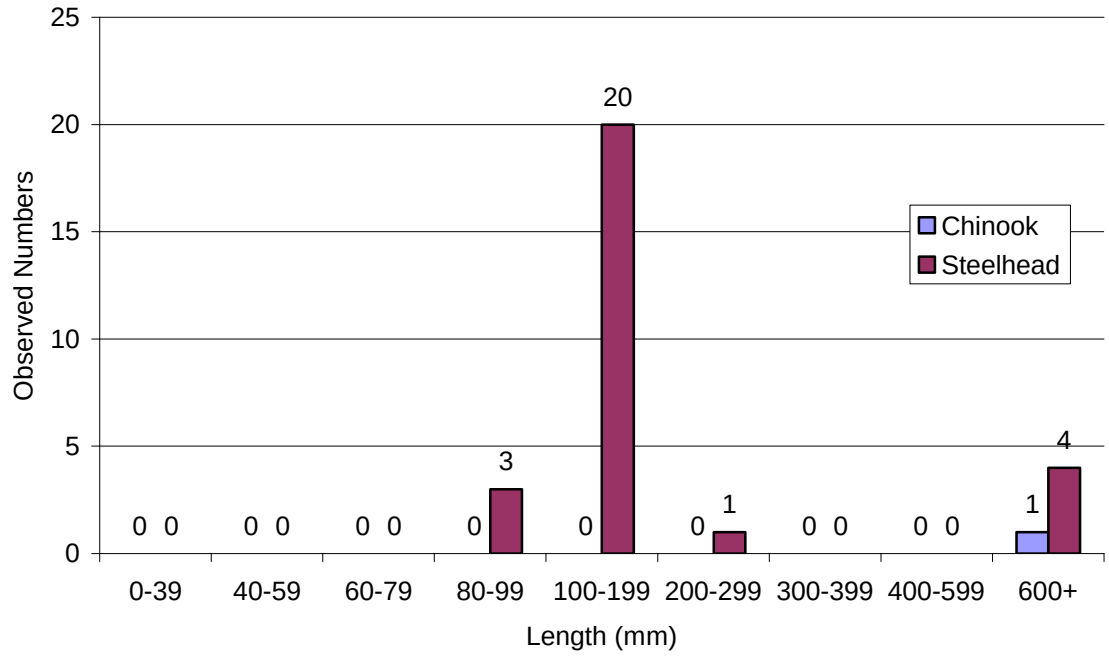
Salmonid Length Frequencies Averaged for all Sampling Locations, July 13-15 2005

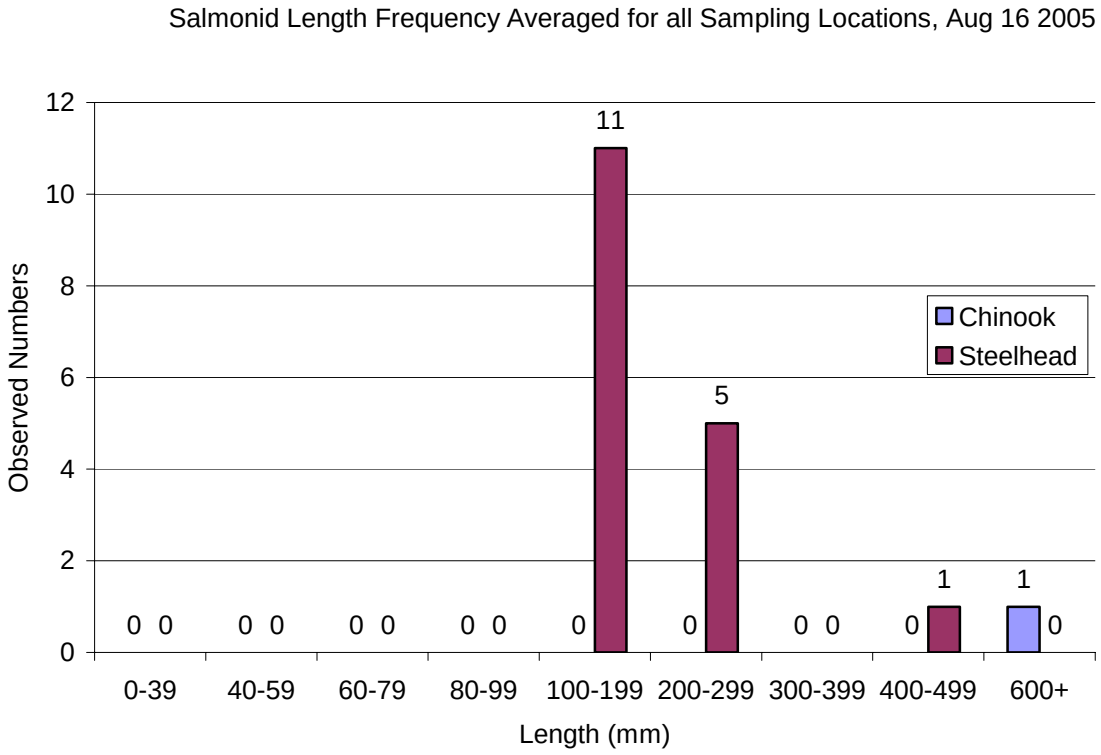


Salmonid Length Frequency Averaged for all Sampling Locations, July 26-27 2005



Salmonid Length Frequencies Averaged for all Sampling Locations, Aug 9 2005




Salmonid Length Frequency Averaged for all Sampling Locations, Aug 16 2005
Observed Numbers
12
10
8
6
4
2
0
0 0
0 0
0 0
0 0
0
11
0
5
0 0
0
1
1
0
Chinook
Steelhead
0-39
40-59
60-79
80-99
100-199
200-299
300-399
400-499
600+
Length (mm)

Appendix B: Raw Data Index for 2005 Surveys

Lower Sunrise 1	600	1600	0	2.67	0.00	1	0.5	13	3	9
Lower Sunrise 2	600	800	0	1.33	0.00	4.5	0.5	12	3	9
Lower Sunrise 3	600	1600	0	2.67	0.00	2.5	0.5	12	3	9
Lower Sunrise 4	600	0	0	0.00	0.00	4.5	1.5	12	3	0
Lower Sunrise 5	600	0	0	0.00	0.00	2.5	0.5	11	3	9
Lower Sunrise 6	600	155	0	0.26	0.00	1.5	0.5	11	3	9
Lower Sunrise 7	600	200	0	0.33	0.00	0.5	0.5	11	3	3
Lower Sunrise 8	1600	0	0	0.00	0.00	6.5	0.5	11	3	0
Lower Sunrise Tot	**5800**	**4355**	**0**	**0.75**	**0.00**	**2.94**	**0.63**	**11.63**	**3.00**	**6.00**

Upper Sunrise 1	600	1200	0	2.00	0.00	0.5	0.5	11	1	7
Upper Sunrise 2	600	350	0	0.58	0.00	0.5	0.5	11	3	3
Upper Sunrise 3	600	115	0	0.19	0.00	0.5	1.5	11	3	7
Upper Sunrise 4	600	41	0	0.07	0.00	0.5	1.5	11	3	7
Upper Sunrise 4A	640	425	0	0.66	0.00	0.5	0.5	11	1	4
Upper Sunrise 5	600	285	0	0.48	0.00	0.5	0.5	11	3	4
Upper Sunrise 6	600	0	0	0.00	0.00	1.5	0.5	11	3	3
Upper Sunrise 7	600	225	10	0.38	0.02	1.5	0.5	11	3	3
Upper Sunrise 8	600	160	0	0.27	0.00	0.5	1.5	10.5	3	9
Upper Sunrise 9	600	945	0	1.58	0.00	2	0.5	11	6	6
Upper Sunrise 10	480	1800	0	3.75	0.00	0.5	0.5	10.5	5	6
Upper Sunrise 11	900	0	0	0.00	0.00	9.5	2.5	11	3	0
Upper Sunrise 12	900	0	1	0.00	0.00	0.5	2.5	0	0	0
Upper Sunrise Tot	**8320**	**5546**	**11**	**0.67**	**0.00**	**1.46**	**1.04**	**10.08**	**2.85**	**4.54**

Sailor lower 1	450	700	0	1.56	0.00	3.5	0.5	11	1	7
Sailor lower 2	450	610	0	1.36	0.00	1.5	0.5	11	6	9
Sailor lower 3	600	150	0	0.25	0.00	0.5	0.5	11	3	0
Sailor lower 4	600	5	0	0.01	0.00	0.5	0.5	11	3	0
Sailor lower 5	900	0	0	0.00	0.00	0.5	0.5	11	3	0
Sailor lower 6	600	0	0	0.00	0.00	0.5	0.5	11	3	0
Sailor lower 7	450	5	1	0.01	0.00	0.5	0.5	11	3	0
Sailor lower 8	600	0	0	0.00	0.00	0.5	0.5	11	3	0
Sailor lower 9	600	0	0	0.00	0.00	0.5	0.5	11	3	0
Sailor lower 10	600	0	0	0.00	0.00	0.5	0.5	11	3	7
Sailor lower 11	600	151	0	0.25	0.00	0.5	1.5	11	3	7
Sailor lower 12	600	473	0	0.79	0.00	0.5	0.5	11	3	7
sailor lower t/a	900	0	0	0.00	0.00	6	2.5	11	3	0
Sailor Lower Total	**7950**	**2094**	**1**	**0.26**	**0.00**	**1.23**	**0.73**	**11.00**	**3.08**	**2.85**

Sailor upper 1	600	0	0	0.00	0.00	1	1.5	11.5	3	0
Sailor upper 2	600	0	0	0.00	0.00	2	2.5	11	3	0
Sailor upper 3	600	540	0	0.90	0.00	0.5	0.5	10	2	8
Sailor upper 4	600	150	0	0.25	0.00	1.5	0	13	2	7
sailor upper 4aa	0	0	0							
Sailor upper 5	600	30	0	0.05	0.00	0.5	0	13	1	7
Sailor upper 6	600	0	0	0.00	0.00	0.5	1.5	11	3	0
Sailor upper 6a	600	7	0	0.01	0.00	1	1.5	14	3	0
Sailor upper 7	600	35	0	0.06	0.00	1.5	0.5	10	1	7
Sailor upper 8	600	25	0	0.04	0.00	2.5	0.5	10	1	8
Sailor upper 9	1500	0	0	0.00	0.00	4.5	0.5	13	3	0
Sailor upper 9a	600	0	0	0.00	0.00	3.5	1.5	10	4	0
sailor upper 10	0	0	0							
trans a	900	0	0	0.00	0.00	3	2.5	11	3	0
Sailor Upper Total	**8400**	**787**	**0**	**0.09**	**0.00**	**1.83**	**1.08**	**11.46**	**2.42**	**3.08**

Nimbus 1	450	425	0	0.94	0.00	3	0.5	10	7	10
Nimbus 2	480	125	0	0.26	0.00	2.5	0.5	12	7	0
Nimbus 3	600	200	0	0.33	0.00	2.5	0.5	12	6	7
Nimbus 4	600	700	0	1.17	0.00	1	0.5	11	3	7
Nimbus 5	600	9	0	0.02	0.00	1	0.5	11	3	0
Nimbus 5a	450	0	0	0.00	0.00	1.5	0	11	4	0
Nimbus 5b										
Nimbus 6	900	0	0	0.00	0.00	11	0.5	11	4	0
Nimbus 7	450	0	0	0.00	0.00	1.5	0.5	10	3	0
Nimbus 7a	600	0	0	0.00	0.00	1.5	0.5	10	3	6
Nimbus 8	600	10	0	0.02	0.00	0.5	0.5	10	1	6
Nimbus 9	900	0	0	0.00	0.00	6.5	1.5	10	4	0
Nimbus Total	**6630**	**1469**	**0**	**0.22**	**0.00**	**2.95**	**0.55**	**10.73**	**4.09**	**3.27**

	march 31 - april 5, 2005									
Survey Site	Area sq.ft	Chinook	Steelhead	CK den	SH den	depth	velocity	temp	substrate	cover
Watt 1	600	0	0	0.00	0.00	5.5	1.5	12	3	0
Watt 2	600	117	0	0.20	0.00	0.5	0.5	12	3	7
Watt 2a	450	90	0	0.20	0.00	0.5	1.5	12	3	6
Watt 3	600	375	0	0.63	0.00	0.5	0.5	12	2	3
Watt 4	900	0	0	0.00	0.00	4.5	2.5	12	3	0
Watt 5	600	360	14	0.60	0.02	0.5	0.5	12	2	6
Watt 6	600	570	12	0.95	0.02	0.5	0.5	12	1	7
Watt 7	600	60	0	0.10	0.00	0.5	0.5	12	1	6
Watt 8	600	0	0	0.00	0.00	2.5	0.5	12	7	0
Watt 9	600	110	0	0.18	0.00	1.5	0.5	12	1	6
Watt 10	600	0	0	0.00	0.00	4.5	0.5	12	1	0
Watt 10a	600	515	0	0.86	0.00	1.5	0.5	12	3	6
Watt 11	600	65	0	0.11	0.00	1.5	2	12	2	0
Watt 12	900	0	0	0.00	0.00	5.6	1.5	12	3	0
Watt Total	**8850**	**2262**	**26**	**0.26**	**0.01**	**2.15**	**0.96**	**12.00**	**2.50**	**3.36**

Gristmill 1	600	920	0	1.53	0.00	0.5	0.5	13	1	8
Gristmill 2	600	490	0	0.00	0.00	0.5	0.5	13	1	6
Gristmill 3	600	110	0	0.18	0.00	0.5	0.5	16	1	7
Gristmill 4	600	0	0	0.00	0.00	0.5	0.5	12	3	0
Gristmill 5	600	10	0	0.02	0.00	0.5	0.5	13	3	0
Gristmill 6	600	0	0	0.00	0.00	3.5	1.5	12	3	0
Gristmill 7	450	216	0	0.48	0.00	0.5	1.5	12	3	7
Gristmill 8	600	250	0	0.42	0.00	0.5	0.5	12.5	4	6
Gristmill Trans A	800	0	0	0.00	0.00	5.5	1.5	12.5	4	0
Gristmill Total	**5450**	**1996**	**0**	**0.37**	**0.00**	**1.39**	**0.83**	**12.89**	**2.56**	**3.78**

Goethe 1	600	1005	0	1.68	0.00	1.5	0.5	13	1	7
Goethe 2	600	150	0	0.25	0.00	2.5	1.5	13	3	6
Goethe 2a	600	230	0	0.38	0.00	3.5	0.5	12	3	0
Goethe 3	600	0	0	0.00	0.00	0.5	1.5	14	3	0
Goethe 4	600	455	0	0.76	0.00	0.5	0.5	13	3	6
Goethe 5	600	350	45	0.58	0.08	0.5	0.5	13	3	6
Goethe 5a	900	0	0	0.00	0.00				3	0
Goethe 6	480	252	20	0.53	0.04	0.5	0.5	13	3	3
Goethe Total	**4980**	**2442**	**65**	**0.49**	**0.03**	**1.36**	**0.79**	**13.00**	**2.75**	**3.50**

Rossmoor 1										
Rossmoor 2										
Rossmoor 3										
Rossmoor 3A										
Rossmoor 4	800	700	0	0.88	0.00	0.5	0.5	13	4	5
Rossmoor 5	900	0	0	0.00	0.00	4.5	1.5	13	4	0
Rossmoor 6	450	1235	0	2.74	0.00	1.5	0.5	13	1	7
Rossmoor 7	480	0	0	0.00	0.00	0.5	0.5	13	2	0
Rossmoor 8	480	1320	0	2.75	0.00	2.5	0.5	13	1	7
Rossmoor A	600	1170	0	1.95	0.00	0.5	0.5	13	1	7
Rossmoor Total	**3710**	**4425**	**0**	**1.19**	**0.00**	**1.67**	**0.67**	**13.00**	**2.17**	**4.33**

Lower Sunrise 1	600	150	0	0.25	0.00	0.5	0.5	13	7	9
Lower Sunrise 2	600	0	0	0.00	0.00	5.5	1.5	13	4	9
Lower Sunrise 3	600	175	0	0.29	0.00	0.5	1.5	13	5	6
Lower Sunrise 4	600	300	0	0.50	0.00	0.5	0.5	13	1	8
Lower Sunrise 5	600	20	0	0.03	0.00	0.5	0.5	13	1	0
Lower Sunrise 6	600	0	0	0.00	0.00	6.5	1.5	13	3	0
Lower Sunrise 7	600	35	0	0.06	0.00	0.5	0.5	13	1	6
Lower Sunrise 8	1600	0	0	0.00	0.00	0	0	0	0	0
Lower Sunrise To	**5800**	**680**	**0**	**0.12**	**0.00**	**1.81**	**0.81**	**11.38**	**2.75**	**4.75**

Upper Sunrise 1	600	475	0	0.79	0.00	0.5	0.5	12	1	7
Upper Sunrise 2	600	190	0	0.32	0.00	0.5	0.5	12	1	7
Upper Sunrise 3	600	470	45	0.78	0.08	0.5	0.5	12.5	2	6
Upper Sunrise 4	600	310	60	0.52	0.10	0.5	0.5	12.5	3	6
Upper Sunrise 4A	640	585	60	0.91	0.09	0.5	0.5	13	3	6
Upper Sunrise 5	600	250	12	0.42	0.02	0.5	0.5	12	3	5
Upper Sunrise 6	600	90	35	0.15	0.06	0.5	0.5	12	3	6
Upper Sunrise 7	600	185	25	0.31	0.04	0.5	0.5	12.5	4	3
Upper Sunrise 8	600	2425	0	4.04	0.00	1.5	0.5	12	6	6
Upper Sunrise 9	600	1175	0	1.96	0.00	2.5	0.5	11	6	4
Upper Sunrise 10	480	1325	0	2.76	0.00	5.5	0.5	11	6	4
Upper Sunrise 11	900	0	0	0.00	0.00	9.5	1.5	12	4	0
Upper Sunrise 12	900	0	0	0.00	0.00	0	0	0	0	0
Upper Sunrise Tot	**8320**	**7480**	**237**	**0.90**	**0.03**	**1.77**	**0.54**	**11.12**	**3.23**	**4.62**

Sailor lower 1	450	1000	0	2.22	0.00	6.5	0.5	11	6	7
Sailor lower 2	450	500	0	1.11	0.00	1.5	0.5	11	6	6
Sailor lower 3	600	2325	0	3.88	0.00	0.5	0.5	12	3	7
Sailor lower 4	600	425	0	0.71	0.00	0.5	0.5	12	1	8
Sailor lower 5	900	0	0	0.00	0.00	3.5	0.5	11	3	0
Sailor lower 6	600	50	0	0.08	0.00	1.5	1.5	11	3	4
Sailor lower 7	450	2	0	0.00	0.00	0.5	1.5	11	3	0
Sailor lower 8	600	285	0	0.48	0.00	0.5	0.5	13.5	3	6
Sailor lower 9	600	165	0	0.28	0.00	0.5	0.5	12.5	3	6
Sailor lower 10	600	10	0	0.02	0.00	0.5	0.5	12	3	3
Sailor lower 11	600	1820	210	3.03	0.35	0.5	1.5	12	4	6
Sailor lower 12	600	1200	120	2.00	0.20	1	0.5	12	3	6
sailor lower t/a	900	0	0	0.00	0.00	6	2.5	12	4	0
Sailor Lower Total	**7950**	**7782**	**330**	**0.98**	**0.04**	**1.81**	**0.88**	**11.77**	**3.46**	**4.54**

Sailor upper 1	600	490	0	0.82	0.00	0.5	0.5	12	1	6
Sailor upper 2										
Sailor upper 3										
Sailor upper 4	600	635	0	1.06	0.00	1.5	0.5	12	1	7
sailor upper 4aa										
Sailor upper 5	600	385	0	0.64	0.00	1.5	0.5	12	1	7
Sailor upper 6	600	0	0	0.00	0.00	0.5	1.5	12	1	0
Sailor upper 6a	600	1	0	0.00	0.00	0.5	0.5	12	4	6
Sailor upper 7	600	350	0	0.58	0.00	0.5	0.5	12	1	8
Sailor upper 8	600	670	0	1.12	0.00	0.5	0.5	12	1	7
Sailor upper 9	1500	0	0	0.00	0.00	6.5	0.5	13	3	0
Sailor upper 9a	600	0	0	0.00	0.00	5.5	1.5	12	4	0
sailor upper 10										
trans a	900	0	0	0.00	0.00	0	0	0	0	0
Sailor Upper Total	**7200**	**2531**	**0**	**0.35**	**0.00**	**1.75**	**0.65**	**10.90**	**1.70**	**4.10**

Nimbus 1	450	700	0	1.56	0.00	1.5	0.5	12	4	7
Nimbus 2	480	55	0	0.11	0.00	1.5	0.5	12	4	7
Nimbus 3	600	120	0	0.20	0.00	0.5	0.5	12	1	7
Nimbus 4	600	200	0	0.33	0.00	1.5	0.5	12	1	7
Nimbus 5	600	0	0	0.00	0.00	0.5	0.5	12	1	0
Nimbus 5a	450	0	0	0.00	0.00	0.5	0.5	12	1	0
Nimbus 5b	450	45	0	0.10	0.00	0.5	0.5	12	3	6
Nimbus 6	900	0	0	0.00	0.00	11	0.5	12	4	0
Nimbus 7	450	110	0	0.24	0.00	0.5	0.5	12	1	7
Nimbus 7a										
Nimbus 8										
Nimbus 9	900	0	0	0.00	0.00	3.5	2.5	12	3	0
Nimbus Total	**5880**	**1230**	**0**	**0.21**	**0.00**	**2.15**	**0.70**	**12.00**	**2.30**	**4.10**

	April 11-12, 2005									
Survey Site	Area sq.ft	Chinook	Steelhead	CK den	SH den	depth	velocity	temp	substrate	cover
Watt 1	600	0	0	0.00	0.00	4.5	0.5	13	3	0
Watt 2	600	150	50	0.25	0.08	0.5	0.5	14	3	6
Watt 2a	450	65	50	0.14	0.11	0.5	1.5	13	3	3
Watt 3	600	245	53	0.41	0.09	0.5	0.5	13	3	6
Watt 4	900	0	0	0.00	0.00	5.5	1.5	13	4	0
Watt 5	600	275	40	0.46	0.07	0.5	0.5	13	2	5
Watt 6	600	160	0	0.27	0.00	1.5	0.5	14	2	3
Watt 7	600	200	0	0.33	0.00	0.5	0.5	13	1	7
Watt 8	600	75	0	0.13	0.00	1.5	0.5	12.5	7	0
Watt 9	600	130	0	0.22	0.00	0.5	0.5	13	1	7
Watt 10	600	0	0	0.00	0.00	1.5	0.5	12	1	0
Watt 10a	600	170	0	0.28	0.00	0.5	0.5	12	2	7
Watt 11	600	6	0	0.01	0.00	0.5	0.5	12	3	0
Watt 12	900	0	0	0.00	0.00	1.5	1.5	12	3	0
Watt Total	**8850**	**1476**	**193**	**0.17**	**0.13**	**1.43**	**0.71**	**12.82**	**2.71**	**3.14**
Gristmill 1	600	155	0	0.26	0.00	0.5	0.5	14	2	6
Gristmill 2	600	355	0	0.59	0.00	0.5	0.5	14	3	6
Gristmill 3	600	270	0	0.45	0.00	0.5	0.5	16	1	8
Gristmill 4	600	25	0	0.04	0.00	0.5	1.5	13	1	0
Gristmill 5	600	170	1	0.28	0.00	1.5	0.5	12	1	4
Gristmill 6	600	0	0	0.00	0.00	5.5	1.5	13	3	0
Gristmill 7	450	380	0	0.84	0.00	0.5	1.5	13	3	4
Gristmill 8	600	215	0	0.36	0.00	0.5	1.5	13	3	3
Gristmill Trans A	800	30	0	0.04	0.00	2.5	0.5	13	4	0
Gristmill Total	**5450**	**1600**	**1**	**0.29**	**0.00**	**1.39**	**0.94**	**13.44**	**2.33**	**3.44**
Goethe 1	600	710	0	1.18	0.00	2.5	0.5	14	1	7
Goethe 2	600	235	0	0.39	0.00	2.5	1.5	14	1	8
Goethe 2a	600	45	0	0.08	0.00	4.5	1.5	14	3	0
Goethe 3	600	0	0	0.00	0.00	0.5	1.5	14	3	0
Goethe 4	600	360	128	0.60	0.21	0.5	0.5	13.5	3	6
Goethe 5	600	350	110	0.58	0.18	0.5	0.5	13.5	3	7
Goethe 5a	900	0	0	0.00	0.00	1.5	2.5	13.5	6	0
Goethe 6	480	62	31	0.13	0.06	2.5	1.5	13.5	4	6
Goethe Total	**4980**	**1762**	**269**	**0.35**	**0.05**	**1.88**	**1.25**	**13.75**	**3.00**	**4.25**

Rossmoor 1	600	0	0	0.00	0.00	2.5	1.5	12.5	3	0
Rossmoor 2	600	75	0	0.13	0.00	1.5	1.5	12.5	6	4
Rossmoor 3	600	25	0	0.04	0.00	1.5	0.5	13	1	6
Rossmoor 3A	450	360	0	0.80	0.00	1.5	1.5	13	1	5
Rossmoor 4	800	71	0	0.09	0.00	0.5	0.5	13	4	3
Rossmoor 5	900	0	0	0.00	0.00	3.5	0.5	12.5	3	0
Rossmoor 6	450	85	30	0.19	0.07	0.5	0.5	13	3	3
Rossmoor 7	480	25	0	0.05	0.00	0.5	0.5	13	3	0
Rossmoor 8	480	240	40	0.50	0.08	0.5	0.5	13	3	0
Rossmoor A	600	230	0	0.38	0.00	1	0.5	13	3	6
Rossmoor Total	**5960**	**1111**	**70**	**0.19**	**0.01**	**1.35**	**0.80**	**12.85**	**3.00**	**2.70**

Lower Sunrise 1	600	250	0	0.00	0.00	1.5	0.5	13.5	3	6
Lower Sunrise 2	600	175	0	0.29	0.00	3.5	0.5	14	4	0
Lower Sunrise 3	600	470	10	0.78	0.02	0.5	0.5	14.5	1	7
Lower Sunrise 4	600	0	0	0.00	0.00	1.5	1.5	13	4	0
Lower Sunrise 5	600	170	0	0.28	0.00	5.5	0.5	13	4	5
Lower Sunrise 6	600	280	0	0.47	0.00	5.5	0.5	13	3	9
Lower Sunrise 7	600	50	0	0.08	0.00	0.5	0.5	13.5	3	0
Lower Sunrise 8	1600	0	0	0.00	0.00	6.5	1.5	13	3	0
Lower Sunrise Tot	**5800**	**1395**	**10**	**0.24**	**0.00**	**3.13**	**0.75**	**13.44**	**3.13**	**3.38**

Upper Sunrise 1	600	1000	0	1.67	0.00	2.5	1.5	13.5	1	7
Upper Sunrise 2	600	1320	0	2.20	0.00	1.5	1.5	13.5	1	6
Upper Sunrise 3	600	45	0	0.08	0.00	1.5	1.5	13	1	6
Upper Sunrise 4	600	15	0	0.03	0.00	1.5	1.5	13	1	6
Upper Sunrise 4A										
Upper Sunrise 5	600	700	0	1.17	0.00	1.5	0.5	12	3	7
Upper Sunrise 6	600	245	4	0.41	0.01	0.5	0.5	12	3	6
Upper Sunrise 7	600	470	0	0.78	0.00	0.5	0.5	12	3	0
Upper Sunrise 8	600	975	65	1.63	0.11	2	0.5	13	6	5
Upper Sunrise 9	600	1185	0	1.98	0.00	2	0.5	13	6	6
Upper Sunrise 10	480	240	0	0.50	0.00	2	0.5	13	5	3
Upper Sunrise 11	900	0	0	0.00	0.00	7.5	1.5	13	4	0
Upper Sunrise 12	900	0	0	0.00	0.00	25	1.5	13	1	0
Upper Sunrise Tot	**7680**	**6195**	**69**	**0.81**	**0.01**	**4.00**	**1.00**	**12.83**	**2.92**	**4.33**
Sailor lower 1	450	3360	0	7.47	0.00	4.5	0.5	12	1	7
Sailor lower 2	450	1000	0	2.22	0.00	3.5	0.5	12	6	4
Sailor lower 3	600	400	0	0.67	0.00	0.5	0.5	13.5	1	7
Sailor lower 4	600	250	0	0.42	0.00	0.5	0.5	13	1	8
Sailor lower 5	900	0	0	0.00	0.00	2.5	1.5	12.5	3	0
Sailor lower 6										
Sailor lower 7	450	0	0	0.00	0.00	0.5	1.5	12.5	3	0
Sailor lower 8	600	0	0	0.00	0.00	0.5	0.5	13	3	0
Sailor lower 9	600	120	0	0.20	0.00	0.5	0.5	14	3	6
Sailor lower 10	600	0	0	0.00	0.00	0.5	0.5	12.5	3	0
Sailor lower 11	600	495	55	0.83	0.09	0.5	0.5	12.5	3	7
Sailor lower 12	600	45	0	0.08	0.00	0.5	0.5	12	1	3
sailor lower t/a	900	0	0	0.00	0.00	6.5	2.5	12.5	3	0
Sailor Lower Total	**7350**	**5670**	**55**	**0.77**	**0.01**	**1.75**	**0.83**	**12.67**	**2.58**	**3.50**

Sailor upper 1	600	180	50	0.30	0.08	0.5	0.5	13	4	6
Sailor upper 2	600	0	0	0.00	0.00	2.5	1.5	12	4	0
Sailor upper 3	600	1620	0	2.70	0.00	2.5	0.5	12.5	2	4
Sailor upper 4	600	160	0	0.27	0.00	0.5	0.5	13	1	7
sailor upper 4aa										
Sailor upper 5	600	1350	0	2.25	0.00	1.5	0.5	14	1	6
Sailor upper 6	600	0	0	0.00	0.00	0.5	0.5	13	4	0
Sailor upper 6a	600	40	0	0.07	0.00	0.5	0.5	13	3	3
Sailor upper 7	600	525	0	0.88	0.00	0.5	0.5	12	1	6
Sailor upper 8	600	150	0	0.25	0.00	1.5	0.5	12	3	7
Sailor upper 9	1500	0	0	0.00	0.00	6.5	0.5	13	3	0
Sailor upper 9a	600	0	0	0.00	0.00	5.5	0.5	12	4	0
sailor upper 10										
trans a	900	0	0	0.00	0.00	5.5	1.5	12	4	0
Sailor Upper Total	**8400**	**4025**	**50**	**0.48**	**0.01**	**2.33**	**0.67**	**12.63**	**2.83**	**3.25**

Nimbus 1	450	30	0	0.07	0.00	1.5	0.5	12	7	5
Nimbus 2	480	10	0	0.02	0.00	1.5	0.5	12	7	0
Nimbus 3	600	200	0	0.33	0.00	0.5	0.5	12	1	7
Nimbus 4	600	75	0	0.13	0.00	0.5	0.5	12	1	7
Nimbus 5	600	60	0	0.10	0.00	0.5	0.5	12	1	6
Nimbus 5a	450	0	0	0.00	0.00	0.5	0.5	12.5	3	0
Nimbus 5b	450	45	0	0.10	0.00	0.5	0.5	12.5	4	3
Nimbus 6	900	0	0	0.00	0.00	14	0.5	12	3	0
Nimbus 7	450	10	0	0.02	0.00	0.5	0.5	12.5	3	0
Nimbus 7a	600	0	0	0.00	0.00	0.5	1.5	12	3	0
Nimbus 8	600	91	19	0.15	0.03	0.5	0.5	12	6	6
Nimbus 9	900	0	0	0.00	0.00	7.5	1.5	12	3	0
Nimbus Total	**7080**	**521**	**19**	**0.07**	**0.00**	**2.38**	**0.67**	**12.13**	**3.50**	**2.83**

	April 26-27, 2005									
Survey Site	Area sq.ft	Chinook	Steelhead	CK den	SH den	depth	velocity	temp	substrate	cover
Watt 1	600	0	0	0.00	0.00	3.5	1.5	12.5	3	0
Watt 2	600	0	0	0.00	0.00	0.5	0.5	13	3	6
Watt 2a	450	12	8	0.03	0.02	0.5	0.5	12.5	3	6
Watt 3	600	52	15	0.09	0.03	0.5	0.5	12.5	3	6
Watt 4	900	0	0	0.00	0.00	4.5	1.5	12.5	3	0
Watt 5	600	304	2	0.51	0.00	1.5	0.5	12	2	8
Watt 6	600	265	30	0.44	0.05	2.5	0.5	12.5	2	5
Watt 7	600	0	0	0.00	0.00	0.5	0.5	13	1	6
Watt 8	600	0	0	0.00	0.00	1.5	0.5	13	7	0
Watt 9	600	0	0	0.00	0.00	1.5	0.5	13	1	0
Watt 10	600	0	0	0.00	0.00	2.5	0.5	13	1	0
Watt 10a	600	70	0	0.12	0.00	0.5	0.5	13	1	8
Watt 11	600	75	0	0.13	0.00	0.5	1.5	13	1	6
Watt 12	900	0	0	0.00	0.00	4.5	0.5	13	1	0
Watt Total	**8850**	**778**	**55**	**0.09**	**0.07**	**1.79**	**0.71**	**12.75**	**2.29**	**3.64**

Gristmill 1										
Gristmill 2										
Gristmill 3										
Gristmill 4										
Gristmill 5										
Gristmill 6										
Gristmill 7										
Gristmill 8										
Gristmill Trans A										
Gristmill Total										

Goethe 1	600	825	0	1.38	0.00	2.5	0.5	13.5	1	6
Goethe 2	600	925	0	1.54	0.00	3.5	1.5	13	1	7
Goethe 2a	600	75	0	0.13	0.00	5.5	1.5	13	3	0
Goethe 3	600	0	25	0.00	0.04	0.5	1.5	13	3	0
Goethe 4	600	173	71	0.29	0.12	0.5	0.5	14	3	6
Goethe 5	600	135	0	0.23	0.00	0.5	0.5	14	3	6
Goethe 5a	900	55	0	0.06	0.00	0.5	0.5	13	4	0
Goethe 6	480	4	3	0.01	0.01	0.5	0.5	13.5	4	0
Goethe Total	**4980**	**2192**	**99**	**0.44**	**0.05**	**1.75**	**0.88**	**13.38**	**2.75**	**3.13**

Rossmoor 1										
Rossmoor 2										
Rossmoor 3										
Rossmoor 3A										
Rossmoor 4										
Rossmoor 5										
Rossmoor 6										
Rossmoor 7										
Rossmoor 8										
Rossmoor A										
Rossmoor Total										

Lower Sunrise 1	600	140	0	0.00	0.00	0.5	0.5	14	3	0
Lower Sunrise 2	600	3650	0	6.08	0.00	0.5	0.5	13.5	4	0
Lower Sunrise 3	600	550	0	0.92	0.00	0.5	0.5	13.5	1	7
Lower Sunrise 4	600	0	0	0.00	0.00	2.5	0.5	13	3	0
Lower Sunrise 5	600	450	0	0.75	0.00	4	0.5	12.5	3	5
Lower Sunrise 6	600	850	0	1.42	0.00	1.5	0.5	13	3	9
Lower Sunrise 7	600	15	50	0.03	0.08	0.5	0.5	13	3	0
Lower Sunrise 8	1600	120	0	0.08	0.00	6.5	0.5	13	3	5
Lower Sunrise To	**5800**	**5775**	**50**	**1.00**	**0.01**	**2.06**	**0.50**	**13.19**	**2.88**	**3.25**

Upper Sunrise 1	600	1000	370	1.67	0.62	2.5	0.5	13	3	5
Upper Sunrise 2	600	445	300	0.74	0.50	0.5	1	13	3	3
Upper Sunrise 3	600	35	5	0.06	0.01	0.5	1.5	13	3	6
Upper Sunrise 4	600	50	20	0.08	0.03	0.5	1.5	13	3	0
Upper Sunrise 4A	640	335	75	0.52	0.12	0.5	0.5	13.5	3	6
Upper Sunrise 5	600	415	0	0.69	0.00	0.5	0.5	12.5	1	6
Upper Sunrise 6	600	80	0	0.13	0.00	1.5	0.5	12.5	3	0
Upper Sunrise 7	600	0	0	0.00	0.00	0.5	0.5	12.5	3	0
Upper Sunrise 8	600	1300	0	2.17	0.00	2.5	0.5	12.5	6	4
Upper Sunrise 9	600	1025	0	1.71	0.00	2.5	0.5	12.5	6	4
Upper Sunrise 10	480	2900	0	6.04	0.00	3.5	0.5	12.5	6	6
Upper Sunrise 11	900	0	0	0.00	0.00	7.5	1.5	12.5	3	0
Upper Sunrise 12	900	200	0	0.22	0.00	1.5	1.5	12.5	4	3
Upper Sunrise Tot	**8320**	**7785**	**770**	**0.94**	**0.10**	**1.88**	**0.85**	**12.73**	**3.62**	**3.31**

Sailor lower 1	450	1000	0	2.22	0.00	6.5	0.5	12.5	6	5
Sailor lower 2	450	550	0	1.22	0.00	1.5	0.5	12	6	4
Sailor lower 3	600	400	0	0.67	0.00	0.5	0.5	13.5	1	6
Sailor lower 4	600	125	0	0.21	0.00	0.5	0.5	13.5	1	7
Sailor lower 5	900	0	0	0.00	0.00	2.5	1.5	12	2	0
Sailor lower 6	600	40	0	0.07	0.00	1.5	1.5	12.5	4	4
Sailor lower 7	450	0	0	0.00	0.00	0.5	1.5	12	3	0
Sailor lower 8	600	0	0	0.00	0.00	0.5	0.5	13	3	6
Sailor lower 9	600	0	0	0.00	0.00	0.5	0.5	14	3	6
Sailor lower 10	600	1	0	0.00	0.00	0.5	0.5	12.5	3	0
Sailor lower 11	600	1340	210	2.23	0.35	3	0.5	12.5	1	6
Sailor lower 12	600	300	79	0.50	0.13	0.5	0.5	13	1	7
sailor lower t/a	900	0	0	0.00	0.00	6.5	2.5	12.5	3	0
Sailor Lower Total	**7950**	**3756**	**289**	**0.47**	**0.08**	**1.92**	**0.88**	**12.73**	**2.85**	**3.92**

Sailor upper 1	600	445	70	0.74	0.12	2	0.5	13	4	3
Sailor upper 2	600	0	0	0.00	0.00	1.5	1.5	12	4	0
Sailor upper 3	600	1970	0	3.28	0.00	1.5	0.5	12	2	6
Sailor upper 4	600	170	0	0.28	0.00	0.5	0.5	14	1	8
sailor upper 4aa										
Sailor upper 5	600	55	0	0.09	0.00	0.5	0.5	14	1	8
Sailor upper 6	600	0	0	0.00	0.00	0.5	0.5	13	3	0
Sailor upper 6a	600	85	0	0.14	0.00	1.5	0.5	13	4	0
Sailor upper 7	600	185	0	0.31	0.00	0.5	0.5	12.5	1	8
Sailor upper 8	600	870	0	1.45	0.00	1.5	0.5	12.5	1	8
Sailor upper 9	1500	0	0	0.00	0.00	4.5	0.5	13	1	0
Sailor upper 9a	600	0	0	0.00	0.00	3.5	0.5	12.5	4	0
sailor upper 10										
trans a	900	0	0	0.00	0.00	4.5	1.5	12	4	0
Sailor Upper Total	**8400**	**3780**	**70**	**0.45**	**0.02**	**1.88**	**0.67**	**12.79**	**2.50**	**3.42**

Nimbus 1	450	55	0	0.12	0.00	1.5	0.5	12	7	0
Nimbus 2	480	0	0	0.00	0.00	1.5	0.5	12	7	0
Nimbus 3	600	120	0	0.20	0.00	0.5	0.5	12	1	8
Nimbus 4	600	125	0	0.21	0.00	0.5	0.5	12.5	1	8
Nimbus 5	600	15	0	0.03	0.00	0.5	0.5	12.5	1	6
Nimbus 5a	450	126	0	0.28	0.00	0.5	0.5	12.5	3	6
Nimbus 5b	450	50	0	0.11	0.00	0.5	0.5	12	4	3
Nimbus 6	900	0	0	0.00	0.00	11	0.5	12	3	0
Nimbus 7	450	2	0	0.00	0.00	0.5	1	12	3	6
Nimbus 7a	600	0	0	0.00	0.00	0.5	1.5	12	3	6
Nimbus 8	600	30	23	0.05	0.04	1	0.5	12	6	7
Nimbus 9										
Nimbus Total	**6180**	**523**	**23**	**0.08**	**0.00**	**1.68**	**0.64**	**12.14**	**3.55**	**4.55**

	May 11-12, 2005									
Survey Site	Area sq.ft	Chinook	Steelhead	CK den	SH den	depth	velocity	temp	substrate	cover
Watt 1	600	0	0	0.00	0.00	3.5	1.5	12.5	3	0
Watt 2	600	4	0	0.01	0.00	0.5	0.5	12.5	2	7
Watt 2a	450	0	0	0.00	0.00	0	0	12.5	0	0
Watt 3	600	61	0	0.10	0.00	0.5	0.5	12.5	3	6
Watt 4	900	0	0	0.00	0.00	1.5	1.5	12.5	3	0
Watt 5	600	365	0	0.61	0.00	0.5	0.5	12.5	2	7
Watt 6	600	310	4	0.52	0.01	5.5	0.5	12.5	2	0
Watt 7	600	150	0	0.25	0.00	0.5	0.5	13	1	7
Watt 8	600	0	0	0.00	0.00	1.5	0.5	13	7	0
Watt 9	600	0	0	0.00	0.00	1.5	0.5	13	1	6
Watt 10	600	0	0	0.00	0.00	2.5	0.5	13	1	0
Watt 10a	600	0	0	0.00	0.00	0.5	0.5	13	1	6
Watt 11	600	30	0	0.05	0.00	0.5	1.5	13	3	6
Watt 12	900	0	0	0.00	0.00	3.5	0.5	12.5	3	0
Watt Total	**8850**	**920**	**4**	**0.10**	**0.00**	**1.61**	**0.68**	**12.71**	**2.29**	**3.21**
Gristmill 1	600	75	4	0.13	0.01	1.5	0.5	13	1	6
Gristmill 2	600	22	0	0.04	0.00	0.5	0.5	13	3	6
Gristmill 3	600	10	0	0.02	0.00	0.5	0.5	15	1	7
Gristmill 4	600	17	0	0.03	0.00	0.5	1.5	13	3	0
Gristmill 5	600	0	0	0.00	0.00	0.5	0.5	14	3	0
Gristmill 6	600	0	0	0.00	0.00	3.5	1.5	13	3	0
Gristmill 7	450	5	2	0.01	0.00	0.5	1.5	13.5	1	6
Gristmill 8	600	0	0	0.00	0.00	0.5	0.5	13.5	3	6
Gristmill Trans A	800	0	0	0.00	0.00	1.5	0.5	13	4	0
Gristmill Total	**5450**	**129**	**6**	**0.02**	**0.00**	**1.06**	**0.83**	**13.44**	**2.44**	**3.44**

Goethe 1	600	200	0	0.33	0.00	2.5	0.5	14	1	6
Goethe 2	600	275	0	0.46	0.00	2.5	0.5	14.5	1	7
Goethe 2a	600	25	0	0.04	0.00	3.5	1.5	14	3	0
Goethe 3	600	0	0	0.00	0.00	0.5	1.5	14	3	0
Goethe 4	600	105	0	0.18	0.00	0.5	0.5	14.5	3	6
Goethe 5	600	90	12	0.15	0.02	0.5	0.5	14.5	3	6
Goethe 5a	900	0	0	0.00	0.00	0.5	1.5	13.5	4	3
Goethe 6	480	0	0	0.00	0.00	0.5	0.5	14	3	6
Goethe Total	**4980**	**695**	**12**	**0.14**	**0.00**	**1.38**	**0.88**	**14.13**	**2.63**	**4.25**

Rossmoor 1	600	0	0	0.00	0.00	5.5	1.5	13	4	0
Rossmoor 2	600	240	0	0.40	0.00	0.5	0.5	13	3	6
Rossmoor 3	600	190	15	0.32	0.03	0.5	0.5	13	3	7
Rossmoor 3A	450	365	40	0.81	0.09	2	0.5	13	3	6
Rossmoor 4	800	0	0	0.00	0.00	1.5	0.5	13.5	3	0
Rossmoor 5	900	0	0	0.00	0.00	3.5	0.5	13.5	3	0
Rossmoor 6	450	25	0	0.06	0.00	1.5	0.5	14	1	6
Rossmoor 7	480	0	0	0.00	0.00	0.5	1.5	13.5	3	0
Rossmoor 8	480	125	0	0.26	0.00	1.5	0.5	13.5	1	5
Rossmoor A	600	5	0	0.01	0.00	2.5	0.5	13.5	7	4
Rossmoor Total	**5960**	**950**	**55**	**0.16**	**0.01**	**1.95**	**0.70**	**13.35**	**3.10**	**3.40**

Lower Sunrise 1	600	450	0	0.00	0.00	2.5	0.5	13	2	9
Lower Sunrise 2	600	50	0	0.08	0.00	5.5	1.5	13	4	9
Lower Sunrise 3	600	0	0	0.00	0.00	0.5	0.5	13	1	8
Lower Sunrise 4	600	0	0	0.00	0.00	1.5	0.5	13	1	6
Lower Sunrise 5	600	450	0	0.75	0.00	5.5	0.5	12	4	9
Lower Sunrise 6	600	685	0	1.14	0.00	2	0.5	12.5	3	9
Lower Sunrise 7	600	200	0	0.33	0.00	1.5	0.5	12.5	3	6
Lower Sunrise 8	1600	0	0	0.00	0.00	8.5	1.5	12	3	0
Lower Sunrise Tot	**5800**	**1835**	**0**	**0.32**	**0.00**	**3.44**	**0.75**	**12.63**	**2.63**	**7.00**

Upper Sunrise 1	600	365	50	0.61	0.08	2	0.5	13	2	7
Upper Sunrise 2	600	80	42	0.13	0.07	0.5	0.5	13	3	3
Upper Sunrise 3	600	25	0	0.04	0.00	0.5	1.5	12.5	1	6
Upper Sunrise 4	600	33	0	0.06	0.00	0.5	1.5	12.5	1	6
Upper Sunrise 4A	640	330	0	0.52	0.00	0.5	0.5	13	3	4
Upper Sunrise 5	600	30	0	0.05	0.00	0.5	0.5	13	3	8
Upper Sunrise 6	600	5	0	0.01	0.00	0.5	0.5	12	3	6
Upper Sunrise 7										
Upper Sunrise 8	600	200	0	0.33	0.00	2.5	0.5	12	6	5
Upper Sunrise 9	600	200	0	0.33	0.00	3.5	0.5	12.5	6	5
Upper Sunrise 10	480	100	0	0.21	0.00	3.5	0.5	12.5	6	5
Upper Sunrise 11	900	0	0	0.00	0.00	7.5	1.5	12.5	4	0
Upper Sunrise 12	900	0	0	0.00	0.00	2.5	1.5	12.5	3	0
Upper Sunrise Tot	**7720**	**1368**	**92**	**0.18**	**0.01**	**2.04**	**0.83**	**12.58**	**3.42**	**4.58**

Sailor lower 1	450	125	0	0.28	0.00	7	0.5	12	1	5
Sailor lower 2	450	155	0	0.34	0.00	2.5	1.5	12	1	6
Sailor lower 3	600	0	0	0.00	0.00	0.5	0.5	12	1	7
Sailor lower 4	600	0	0	0.00	0.00	0.5	0.5	12	1	6
Sailor lower 5	900	0	0	0.00	0.00	3.5	1.5	12	3	0
Sailor lower 6	600	0	0	0.00	0.00	2.5	2.5	12	6	0
Sailor lower 7										
Sailor lower 8	600	0	0	0.00	0.00	0.5	0.5	12	1	8
Sailor lower 9	600	0	0	0.00	0.00	0.5	0.5	12	1	8
Sailor lower 10	600	0	0	0.00	0.00	0.5	1.5	12	3	6
Sailor lower 11	600	335	0	0.56	0.00	2	0.5	12	1	8
Sailor lower 12	600	80	18	0.13	0.03	0.5	0.5	12	1	4
sailor lower t/a	900	0	0	0.00	0.00	7.5	3.5	12	4	0
Sailor Lower Tota	**7500**	**695**	**18**	**0.09**	**0.00**	**2.33**	**1.17**	**12.00**	**2.00**	**4.83**

Sailor upper 1	600	410	0	0.68	0.00	1.5	0.5	12.5	4	7
Sailor upper 2	600	0	0	0.00	0.00	1.5	1.5	12	4	0
Sailor upper 3	600	935	30	1.56	0.05	2.5	0.5	12	2	6
Sailor upper 4	600	80	0	0.13	0.00	1.5	0.5	14	1	7
sailor upper 4aa	600	35	0	0.06	0.00	0.5	0.5	14	3	6
Sailor upper 5	600	30	0	0.05	0.00	1.5	0.5	13.5	3	6
Sailor upper 6	600	0	0	0.00	0.00	0.5	0.5	13	4	3
Sailor upper 6a	600	25	2	0.04	0.00	0.5	0.5	14.5	4	3
Sailor upper 7	600	30	0	0.05	0.00	1.5	0.5	12	1	6
Sailor upper 8	600	225	0	0.38	0.00	1.5	0.5	12.5	1	9
Sailor upper 9	1500	0	0	0.00	0.00	5.5	0.5	13	4	3
Sailor upper 9a	600	0	0	0.00	0.00	2.5	0.5	12.5	3	0
sailor upper 10	600	140	0	0.23	0.00	1.5	0.5	15	3	0
trans a	900	0	0	0.00	0.00	5.5	1.5	12	4	0
Sailor Upper Total	**9600**	**1910**	**32**	**0.20**	**0.02**	**2.00**	**0.64**	**13.04**	**2.93**	**4.00**

Nimbus 1	450	0	0	0.00	0.00	1.5	0.5	12	7	5
Nimbus 2	480	0	0	0.00	0.00	1.5	0.5	12	7	0
Nimbus 3	600	105	0	0.18	0.00	1.5	0.5	12.5	3	8
Nimbus 4	600	135	0	0.23	0.00	0.5	0.5	13	1	7
Nimbus 5	600	40	0	0.07	0.00	0.5	0.5	13	1	6
Nimbus 5a	450	0	0	0.00	0.00	1.5	0.5	12	3	6
Nimbus 5b	450	20	0	0.04	0.00	0.5	0.5	12	2	3
Nimbus 6	900	0	0	0.00	0.00	11	0.5	12	3	0
Nimbus 7	450	85	0	0.19	0.00	0.5	0.5	12	3	3
Nimbus 7a	600	0	0	0.00	0.00	1.5	1.5	12	3	7
Nimbus 8										
Nimbus 9	900	0	0	0.00	0.00	9	2.5	12	4	0
Nimbus Total	**6480**	**385**	**0**	**0.06**	**0.00**	**2.68**	**0.77**	**12.23**	**3.36**	**4.09**

	May 26-27, 2005									
Survey Site	Area sq.ft	Chinook	Steelhead	CK den	SH den	depth	velocity	temp	substrate	cover
Watt 1	600	0	0	0.00	0.00	4.5	0.5	13.5	3	0
Watt 2	600	0	0	0.00	0.00	1.5	1.5	13	2	6
Watt 2a										
Watt 3										
Watt 4										
Watt 5										
Watt 6										
Watt 7										
Watt 8	600	0	0	0.00	0.00	1.5	0.5	13	7	0
Watt 9	600	0	0	0.00	0.00	4.5	0.5	13	1	0
Watt 10	600	0	0	0.00	0.00	4.5	0.5	13.5	3	0
Watt 10a	600	0	0	0.00	0.00	1.5	0.5	13.5	1	6
Watt 11	600	0	0	0.00	0.00	0.5	1.5	12.5	3	0
Watt 12	900	0	0	0.00	0.00	6.5	0.5	12.5	3	0
Watt Total	**5100**	**0**	**0**	**0.00**	**0.00**	**3.13**	**0.75**	**13.06**	**2.88**	**1.50**
Gristmill 1										
Gristmill 2										
Gristmill 3										
Gristmill 4										
Gristmill 5										
Gristmill 6										
Gristmill 7										
Gristmill 8										
Gristmill Trans A										
Gristmill Total										
Goethe 1	600	240	0	0.40	0.00	2.5	0.5	12.5	1	7
Goethe 2	600	50	0	0.08	0.00	5.5	1.5	12.5	1	8
Goethe 2a	600	0	0	0.00	0.00	6.5	1.5		1	0
Goethe 3	600	0	3	0.04	0.01	1.5	2.5		3	6
Goethe 4	600	25	0	0.03	0.00	0.5	0.5	13.5	2	6
Goethe 5	600	18	0	0.00	0.00	0.5	0.5	13	2	6
Goethe 5a	900	0	0	0.00	0.00	2.5	2.5	13	4	0
Goethe 6	480	0	0	0.69	0.00	3.5	1.5	13	3	0
Goethe Total	**4980**	**333**	**3**	**0.07**	**0.01**	**2.88**	**1.38**	**12.92**	**2.13**	**4.13**
Rossmoor 1										
Rossmoor 2										
Rossmoor 3										
Rossmoor 3A										
Rossmoor 4	800	14	7	0.02	0.01	2.5	0.5	13	4	6
Rossmoor 5	900	90	0	0.10	0.00	3.5	0.5	13	2	7
Rossmoor 6	450	105	2	0.23	0.00	2.5	0.5	13	1	7
Rossmoor 7	480	0	0	0.00	0.00	0.5	0.5		2	0
Rossmoor 8	480	1	0	0.00	0.00	2.5	0.5		1	7
Rossmoor A	600	61	0	0.10	0.00	2.5	0.5	13	2	6
Rossmoor Total	**3710**	**271**	**9**	**0.07**	**0.03**	**2.33**	**0.50**	**13.00**	**2.00**	**5.50**

Lower Sunrise 1	600	215	0	0.00	0.00	3.5	0.5	13.5	2	9
Lower Sunrise 2	600	30	0	0.05	0.00	6.5	1.5	13.5	3	9
Lower Sunrise 3	600	20	0	0.03	0.00	0.5	0.5	13.5	1	8
Lower Sunrise 4	600	0	0	0.00	0.00	2.5	1.5	13.5	1	0
Lower Sunrise 5	600	70	0	0.12	0.00	6.5	0.5	13	3	7
Lower Sunrise 6	600	0	0	0.00	0.00	2.5	0.5	13	3	0
Lower Sunrise 7	600	0	0	0.00	0.00	1.5	0.5	13	3	0
Lower Sunrise 8	1600	0	0	0.00	0.00	7.5	1.5	13	3	0
Lower Sunrise Tot	**5800**	**335**	**0**	**0.06**	**0.00**	**3.88**	**0.88**	**13.25**	**2.38**	**4.13**

Upper Sunrise 1	600	130	69	0.22	0.12	0.5	0.5	13	3	6
Upper Sunrise 2	600	54	32	0.09	0.05	0.5	0.5	13	3	0
Upper Sunrise 3	600	13	2	0.02	0.00	0.5	1.5	12.5	1	6
Upper Sunrise 4	600	2	0	0.00	0.00	0.5	1.5	12.5	3	0
Upper Sunrise 4A	640	45	25	0.07	0.04	0.5	0.5	13	1	7
Upper Sunrise 5	600	0	0	0.00	0.00	1.5	0.5	12	2	6
Upper Sunrise 6	600	28	0	0.05	0.00	0.5	0.5	12.5	2	7
Upper Sunrise 7	600	30	0	0.05	0.00	0.5	0.5	13	2	6
Upper Sunrise 8										
Upper Sunrise 9										
Upper Sunrise 10										
Upper Sunrise 11										
Upper Sunrise 12	900	0	0	0.00	0.00	2.5	1.5	12.5	3	0
Upper Sunrise Tot	**5740**	**302**	**128**	**0.05**	**0.42**	**0.83**	**0.83**	**12.67**	**2.22**	**4.22**

Sailor lower 1	450	0	0	0.00	0.00	6.5	0.5		1	5
Sailor lower 2	450	0	0	0.00	0.00	3.5	0.5		6	0
Sailor lower 3	600	4	0	0.01	0.00	1.5	0.5		3	6
Sailor lower 4	600	4	0	0.01	0.00	0.5	0.5	11	1	7
Sailor lower 5	900	0	0	0.00	0.00	4.5	1.5	11	4	0
Sailor lower 6	600	1	0	0.00	0.00	3.5	1.5	11	6	6
Sailor lower 7										
Sailor lower 8										
Sailor lower 9										
Sailor lower 10										
Sailor lower 11										
Sailor lower 12										
sailor lower t/a										
Sailor Lower Total	**3600**	**9**	**0**	**0.00**	**0.00**	**3.33**	**0.83**	**11.00**	**3.50**	**4.00**

Sailor upper 1	600	80	0	0.13	0.00	3.5	1		1	6
Sailor upper 2	600	0	0	0.00	0.00	3.5	1	0	0	0
Sailor upper 3										
Sailor upper 4	600	0	0	0.00	0.00	1.5	0.5	14	1	7
sailor upper 4aa	600	0	0	0.00	0.00	0.5	0.5		3	6
Sailor upper 5	600	2	0	0.00	0.00	1.5	0.5	13	1	7
Sailor upper 6	600	0	0	0.00	0.00	0.5	0.5		3	0
Sailor upper 6a	600	0	0	0.00	0.00	0.5	0.5		3	5
Sailor upper 7	600	200	0	0.33	0.00	2.5	0.5	12	1	6
Sailor upper 8	600	100	0	0.17	0.00	2.5	0.5	12	1	8
Sailor upper 9	1500	0	0	0.00	0.00	6.5	0.5	14	3	0
Sailor upper 9a	600	0	0	0.00	0.00	5.5	0.5	12	3	0
sailor upper 10	600	21	0	0.04	0.00	0.5	0.5		3	6
trans a										
Sailor Upper Total	**8100**	**403**	**0**	**0.05**	**0.00**	**2.42**	**0.58**	**11.00**	**1.92**	**4.25**

Nimbus 1	June 14-15, 2005									
Survey Site	Area sq.ft	Chinook	Steelhead	CK den	SH den	depth	velocity	temp	substrate	cover
Watt 1	600	0	0	0.00	0.00	3.5	0.5	13	3	0
Watt 2	600	0	0	0.00	0.00	1.5	1.5	13	3	6
Watt 2a	450	0	0	0.00	0.00	2.5	0.5	13	3	6
Watt 3	600	0	0	0.00	0.00	4.5	0.5	13	3	0
Watt 4										
Watt 5										
Watt 6										
Watt 7	600	0	0	0.00	0.00	2.5	0.5	14	1	7
Watt 8	600	0	0	0.00	0.00	1.5	0.5	13.5	7	0
Watt 9	600	0	0	0.00	0.00	1.5	1	13.5	1	0
Watt 10	600	0	0	0.00	0.00	4.5	0.5	14	3	0
Watt 10a	600	0	0	0.00	0.00	2.5	0.5	14	1	7
Watt 11	600	0	0	0.00	0.00	0.5	1.5	13	3	0
Watt 12	900	0	0	0.00	0.00	7.5	0.5	13	3	0
Watt Total	**6750**	**0**	**0**	**0.00**	**0.00**	**2.95**	**0.73**	**13.36**	**2.82**	**2.36**

Gristmill 1	
Gristmill 2	
Gristmill 3	
Gristmill 4	
Gristmill 5	
Gristmill 6	
Gristmill 7	
Gristmill 8	
Gristmill Trans A	
Gristmill Total	

Goethe 1	600	0	0	0.00	0.00	3.5	0.5	14	1	7
Goethe 2	600	0	0	0.00	0.00	5.5	1.5	13.5	1	7
Goethe 2a	600	0	0	0.00	0.00	6.5	1.5	13.5	3	0
Goethe 3	600	0	0	0.00	0.00	0.5	1.5	13.5	3	0
Goethe 4	600	0	0	0.00	0.00	0.5	0.5	14	2	7
Goethe 5	600	0	0	0.00	0.00	0.5	1.5	13.5	3	6
Goethe 5a	900	0	1	0.00	0.00	1.5	1.5	13	6	0
Goethe 6	480	0	0	0.00	0.00	3.5	0.5	13	3	0
Goethe Total	**4980**	**0**	**1**	**0.00**	**0.00**	**2.75**	**1.13**	**13.50**	**2.75**	**3.38**

Rossmoor 1	[redacted]
Rossmoor 2	
Rossmoor 3	
Rossmoor 3A	
Rossmoor 4	
Rossmoor 5	
Rossmoor 6	
Rossmoor 7	
Rossmoor 8	
Rossmoor A	
Rossmoor Total	

Lower Sunrise 1	600	125	10	0.00	0.02	2.5	0.5	14	3	9
Lower Sunrise 2	600	1	0	0.00	0.00	9	1.5	14	4	9
Lower Sunrise 3	600	1	0	0.00	0.00	1.5	0.5	14	1	7
Lower Sunrise 4	600	0	0	0.00	0.00	4.5	0.5	14	3	0
Lower Sunrise 5	600	75	0	0.13	0.00	6.5	0.5	13	1	6
Lower Sunrise 6	600	0	0	0.00	0.00	2.5	0.5	13	3	9
Lower Sunrise 7	600	0	0	0.00	0.00	0.5	0.5	13	3	6
Lower Sunrise 8	1600	0	0	0.00	0.00	5.5	1.5	13	3	0
Lower Sunrise Tot	**5800**	**202**	**10**	**0.03**	**0.00**	**4.06**	**0.75**	**13.50**	**2.63**	**5.75**

Upper Sunrise 1	600	102	45	0.17	0.08	2.5	0.5	12	3	6
Upper Sunrise 2	600	31	15	0.05	0.03	1.5	0.5	12.5	3	6
Upper Sunrise 3	600	25	10	0.04	0.02	0.5	1.5	13	1	7
Upper Sunrise 4	600	0	1	0.00	0.00	0.5	1.5	13	1	6
Upper Sunrise 4A	640	38	0	0.06	0.00	1.5	0.5	13	3	7
Upper Sunrise 5	600	17	6	0.03	0.01	1.5	1.5	13	1	7
Upper Sunrise 6	600	0	0	0.00	0.00	0.5	0.5	13	3	0
Upper Sunrise 7	600	21	16	0.04	0.03	1.5	0.5	12.5	3	6
Upper Sunrise 8	[redacted]									
Upper Sunrise 9										
Upper Sunrise 10										
Upper Sunrise 11										
Upper Sunrise 12	900	0	0	0.00	0.00	3.5	1.5	13	3	0
Upper Sunrise Tot	**5740**	**234**	**93**	**0.04**	**0.02**	**1.50**	**0.94**	**12.78**	**2.33**	**5.00**

Sailor lower 1	450	0	0	0.00	0.00	9	0.5	13	1	4
Sailor lower 2	450	0	0	0.00	0.00	3.5	1.5	13	6	7
Sailor lower 3	600	60	10	0.10	0.02	1.5	0.5	13.5	1	7
Sailor lower 4	600	53	29	0.09	0.05	1.5	0.5	12.5	3	6
Sailor lower 5	900	0	0	0.00	0.00	2.5	2.5	12.5	3	0
Sailor lower 6	600	0	2	0.00	0.00	2.5	1.5	12.5	5	0
Sailor lower 7										
Sailor lower 8										
Sailor lower 9										
Sailor lower 10										
Sailor lower 11										
Sailor lower 12										
sailor lower t/a										
Sailor Lower Tota	**3600**	**113**	**41**	**0.03**	**0.01**	**3.42**	**1.17**	**12.83**	**3.17**	**4.00**

Sailor upper 1	600	186	28	0.31	0.05	1.5	0.5	12.5	4	6
Sailor upper 2										
Sailor upper 3										
Sailor upper 4	600	0	0	0.00	0.00	2.5	0.5	16	1	7
sailor upper 4aa	600	0	0	0.00	0.00	0.5	0.5	14	3	6
Sailor upper 5	600	0	0	0.00	0.00	2.5	0.5	16	1	8
Sailor upper 6	600	0	0	0.00	0.00	0.5	0.5	14	3	0
Sailor upper 6a	600	5	0	0.01	0.00	0.5	0.5	13	3	7
Sailor upper 7	600	0	0	0.00	0.00	2.5	0.5	13	1	7
Sailor upper 8	600	0	0	0.00	0.00	2.5	0.5	13	1	6
Sailor upper 9	1500	0	0	0.00	0.00	6.5	0.5	16	3	0
Sailor upper 9a	600	30	0	0.05	0.00	0.5	0.5	13	3	0
sailor upper 10	600	0	0	0.00	0.00	0.5	0.5	14	3	0
trans a	900	0	0	0.00	0.00	2.5	2.5	12	4	0
Sailor Upper Total	**8400**	**221**	**28**	**0.03**	**0.00**	**1.92**	**0.67**	**13.88**	**2.50**	**3.92**

Nimbus 1	450	0	0	0.00	0.00	2.5	0.5	12.5	7	5
Nimbus 2	480	0	0	0.00	0.00	1.5	0.5	13	7	5
Nimbus 3	600	0	0	0.00	0.00	2.5	0.5	12	1	7
Nimbus 4	600	0	0	0.00	0.00	1.5	0.5	12	1	6
Nimbus 5										
Nimbus 5a	450	0	0	0.00	0.00	1.5	0.5	12.5	3	7
Nimbus 5b	450	0	0	0.00	0.00	0.5	0.5	12.5	3	0
Nimbus 6	900	0	0	0.00	0.00	18	0.5	13	4	0
Nimbus 7	450	31	8	0.07	0.02	1.5	0.5	12	3	0
Nimbus 7a										
Nimbus 8										
Nimbus 9	900	0	0	0.00	0.00	5.5	2.5	12	3	0
Nimbus Total	**5280**	**31**	**8**	**0.01**	**0.00**	**3.89**	**0.72**	**12.39**	**3.56**	**3.33**

	June 28-29, 2005									
Survey Site	Area sq.ft	Chinook	Steelhead	CK den	SH den	depth	velocity	temp	substrate	cover
Watt 1	600	0	0	0.00	0.00	4.5	1.5	13.5	3	0
Watt 2	600	0	0	0.00	0.00	1.5	0.5	13.5	3	0
Watt 2a	450	0	0	0.00	0.00	1.5	1.5	13.5	3	6
Watt 3	600	0	0	0.00	0.00	0.5	0.5	13.5	3	6
Watt 4	900	0	0	0.00	0.00	3.5	1.5	13.5	3	0
Watt 5	600	2	11	0.00	0.02	0.5	0.5	13.5	2	5
Watt 6	600	0	0	0.00	0.00	4.5	0.5	13.5	2	0
Watt 7	600	0	0	0.00	0.00	4.5	0.5	15	1	6
Watt 8	600	0	0	0.00	0.00	0.5	0.5	14.5	7	0
Watt 9	600	0	0	0.00	0.00	1.5	0.5	14.5	1	6
Watt 10	600	0	0	0.00	0.00	3.5	0.5	14.5	1	0
Watt 10a	600	0	0	0.00	0.00	2.5	0.5	14.5	1	6
Watt 11	600	0	0	0.00	0.00	0.5	1.5	15	3	0
Watt 12	900	0	0	0.00	0.00	4.5	0.5	15	3	0
Watt Total	**8850**	**2**	**11**	**0.00**	**0.00**	**2.43**	**0.79**	**14.11**	**2.57**	**2.50**
Gristmill 1	600	0	0	0.00	0.00	0.5	0.5	14	1	6
Gristmill 2	600	0	0	0.00	0.00	1.5	0.5	14	1	7
Gristmill 3	600	0	0	0.00	0.00	0.5	0.5	15	1	6
Gristmill 4	600	0	0	0.00	0.00	0.5	1.5	15.5	3	0
Gristmill 5	600	0	0	0.00	0.00	1.5	0.5	15	1	0
Gristmill 6	600	0	0	0.00	0.00	5.5	1.5	15	3	0
Gristmill 7	450	0	0	0.00	0.00	1.5	1.5	16	1	5
Gristmill 8	600	0	1	0.00	0.00	0.5	0.5	14.5	3	3
Gristmill Trans A	800	0	0	0.00	0.00	3.5	0.5	14	4	0
Gristmill Total	**5450**	**0**	**1**	**0.00**	**0.00**	**1.72**	**0.83**	**14.78**	**2.00**	**3.00**
Goethe 1	600	0	0	0.00	0.00	2.5	0.5	15	1	6
Goethe 2	600	0	0	0.00	0.00	5.5	0.5	15	1	7
Goethe 2a	600	0	0	0.00	0.00	6.5	0.5	15	3	0
Goethe 3	600	0	0	0.00	0.00	0.5	1.5	15	3	0
Goethe 4	600	0	0	0.01	0.00	0.5	0.5	15	3	0
Goethe 5	600	3	1	0.00	0.00	0.5	0.5	15	3	0
Goethe 5a	900	0	1	0.00	0.00	1.5	1.5	14	6	0
Goethe 6	480	0	0	0.01	0.00	1.5	0.5	14	3	0
Goethe Total	**4980**	**3**	**2**	**0.00**	**0.67**	**2.38**	**0.75**	**14.75**	**2.88**	**1.63**
Rossmoor 1	600	0	0	0.00	0.00	4.5	1.5	14	4	0
Rossmoor 2	600	0	0	0.00	0.00	0.5	0.5	14.5	3	0
Rossmoor 3	600	0	0	0.00	0.00	0.5	0.5	14.5	3	6
Rossmoor 3A	450	0	0	0.00	0.00	0.5	0.5	14.5	3	7
Rossmoor 4	800	0	0	0.00	0.00	3.5	0.5	15.5	7	0
Rossmoor 5	900	0	3	0.00	0.00	3.5	0.5	15	1	4
Rossmoor 6	450	0	0	0.00	0.00	1.5	0.5	15	4	0
Rossmoor 7	480	0	0	0.00	0.00	0.5	0.5	16	1	0
Rossmoor 8	480	0	0	0.00	0.00	2.5	0.5	16	1	5
Rossmoor A	600	0	0	0.00	0.00	1.5	0.5	15.5	3	0
Rossmoor Total	**5960**	**0**	**3**	**0.00**	**0.00**	**1.90**	**0.60**	**15.05**	**3.00**	**2.20**

Lower Sunrise 1	600	0	0	0.00	0.00	2.5	0.5	15	1	9
Lower Sunrise 2	600	10	10	0.02	0.02	7	1.5	15	1	9
Lower Sunrise 3	600	0	0	0.00	0.00	0.5	0.5	17	1	0
Lower Sunrise 4	600	0	0	0.00	0.00	6.5	0.5	15.5	3	0
Lower Sunrise 5	600	68	0	0.11	0.00	5.5	0.5	14	3	9
Lower Sunrise 6	600	0	0	0.00	0.00	0.5	0.5	14	3	0
Lower Sunrise 7	600	0	0	0.00	0.00	0.5	0.5	15	3	0
Lower Sunrise 8	1600	0	0	0.00	0.00	5.5	1.5	14	3	0
Lower Sunrise Tot	**5800**	**78**	**10**	**0.01**	**0.13**	**3.56**	**0.75**	**14.94**	**2.25**	**3.38**

Upper Sunrise 1	600	51	44	0.09	0.07	1.5	0.5	15	4	6
Upper Sunrise 2	600	0	6	0.00	0.01	0.5	0.5	14.5	4	0
Upper Sunrise 3	600	0	0	0.00	0.00	0.5	1.5	13	3	0
Upper Sunrise 4	600	0	0	0.00	0.00	0.5	0.5	15	3	0
Upper Sunrise 4A	640	0	6	0.00	0.01	0.5	0.5	15	3	0
Upper Sunrise 5	600	0	0	0.00	0.00	0.5	0.5	14	3	5
Upper Sunrise 6	600	0	0	0.00	0.00	0.5	0.5	14	4	0
Upper Sunrise 7	600	0	0	0.00	0.00	1.5	0.5	14	4	0
Upper Sunrise 8	600	1	50	0.00	0.08	4.5	0.5	15	6	0
Upper Sunrise 9	600	25	25	0.04	0.04	9	0.5	11	6	4
Upper Sunrise 10	480	0	60	0.00	0.13	7	0.5	15	6	5
Upper Sunrise 11	900	0	0	0.00	0.00	17.5	0.5	15	6	0
Upper Sunrise 12	900	0	0	0.00	0.00	1.5	1.5	14.5	4	0
Upper Sunrise Tot	**8320**	**77**	**191**	**0.01**	**2.48**	**3.50**	**0.65**	**14.23**	**4.31**	**1.54**

Sailor lower 1	450	0	0	0.00	0.00	9	0.5	15	1	7
Sailor lower 2	450	0	0	0.00	0.00	3.5	0.5	14	6	0
Sailor lower 3	600	0	0	0.00	0.00	0.5	0.5	16	3	0
Sailor lower 4	600	0	0	0.00	0.00	0.5	1.5	14	3	0
Sailor lower 5	900	0	0	0.00	0.00	3.5	1.5	15	3	0
Sailor lower 6	600	0	1	0.00	0.00	2.5	1.5	14	6	0
Sailor lower 7	450	0	0	0.00	0.00	0.5	1.5	14.5	3	0
Sailor lower 8	600	0	0	0.00	0.00	0.5	0.5	15	3	6
Sailor lower 9	600	0	0	0.00	0.00	0.5	0.5	16	3	6
Sailor lower 10	600	0	0	0.00	0.00	0.5	0.5	14	3	0
Sailor lower 11	600	0	0	0.00	0.00	1.5	0.5	13.5	3	6
Sailor lower 12	600	0	0	0.00	0.00	0.5	0.5	13.5	1	3
sailor lower t/a	900	0	0	0.00	0.00	0.5	0.5	13.5	1	3
Sailor Lower Tota	**7950**	**0**	**1**	**0.00**	**0.00**	**1.85**	**0.81**	**14.46**	**3.00**	**2.38**

Sailor upper 1	600	7	5	0.01	0.01	0.5	0.5	14.5	4	2
Sailor upper 2	600	0	0	0.00	0.00	1.5	1.5	13.5	4	0
Sailor upper 3	600	69	34	0.12	0.06	1	0.5	13.5	2	6
Sailor upper 4	600	0	0	0.00	0.00	3.5	0.5	18	1	6
sailor upper 4aa										
Sailor upper 5	600	0	0	0.00	0.00	1.5	0.5	17.5	1	0
Sailor upper 6	600	0	0	0.00	0.00	0.5	0.5	15	4	0
Sailor upper 6a	600	0	0	0.00	0.00	0.5	0.5	16.5	4	0
Sailor upper 7	600	0	0	0.00	0.00	1.5	0.5	15	1	6
Sailor upper 8	600	0	0	0.00	0.00	2.5	0.5	15	1	6
Sailor upper 9	1500	0	0	0.00	0.00	6.5	0.5	18	1	6
Sailor upper 9a	600	0	0	0.00	0.00	4.5	0.5	15	3	0
sailor upper 10										
trans a	900	0	0	0.00	0.00	4.5	1.5	13.5	4	0
Sailor Upper Total	**8400**	**76**	**39**	**0.01**	**0.00**	**2.38**	**0.67**	**15.42**	**2.50**	**2.67**

Nimbus 1	450	0	0	0.00	0.00	4.5	0.5	15	7	5
Nimbus 2	480	0	0	0.00	0.00	3.5	0.5	15.5	7	0
Nimbus 3	600	0	0	0.00	0.00	1.5	0.5	15	1	0
Nimbus 4	600	0	0	0.00	0.00	1.5	0.5	16	1	6
Nimbus 5	600	0	0	0.00	0.00	0.5	0.5	16	1	6
Nimbus 5a	450	0	0	0.00	0.00	0.5	0.5	15	3	0
Nimbus 5b	450	0	0	0.00	0.00	0.5	0.5	15	3	0
Nimbus 6	900	0	0	0.00	0.00	16	0.5	15	2	0
Nimbus 7	450	0	0	0.00	0.00	0.5	0.5	13.5	3	6
Nimbus 7a	600	0	0	0.00	0.00	0.5	1.5	13.5	3	0
Nimbus 8	600	2	0	0.00	0.00	0.5	0.5	13.5	6	7
Nimbus 9	900	0	0	0.00	0.00	7.5	1.5	13.5	3	0
Nimbus Total	**7080**	**2**	**0**	**0.00**	**0.00**	**3.13**	**0.67**	**14.71**	**3.33**	**2.50**

	July 13-15, 2005									
Survey Site	Area sq.ft	Chinook	Steelhead	CK den	SH den	depth	velocity	temp	substrate	cover
Watt 1	600	0	0	0.00	0.00	4.5	1.5	15.5	3	0
Watt 2										
Watt 2a										
Watt 3										
Watt 4										
Watt 5										
Watt 6										
Watt 7	600	0	0	0.00	0.00	0.5	0.5	15.5	1	5
Watt 8	600	0	0	0.00	0.00	1.5	0.5	15.5	7	0
Watt 9	600	0	0	0.00	0.00	0.5	1	15.5	1	0
Watt 10	600	0	0	0.00	0.00	2.5	0.5	15.5	1	0
Watt 10a	600	0	0	0.00	0.00	1.5	0.5	15.5	1	0
Watt 11	600	0	0	0.00	0.00	0.5	1.5	15.5	3	0
Watt 12	900	0	0	0.00	0.00	5.5	0.5	15.5	3	0
Watt Total	**5100**	**0**	**0**	**0.00**	**0.00**	**2.13**	**0.81**	**15.50**	**2.50**	**0.63**

Gristmill 1	600	0	0	0.00	0.00	0.5	0.5	17	2	6
Gristmill 2	600	0	0	0.00	0.00	0.5	0.5	17	2	3
Gristmill 3	600	0	0	0.00	0.00	1.5	5	18	1	7
Gristmill 4	600	0	0	0.00	0.00	0.5	0.5	18	3	0
Gristmill 5	600	0	0	0.00	0.00	1.5	0.5	18	3	0
Gristmill 6	600	0	0	0.00	0.00	4.5	1.5	18	3	0
Gristmill 7	450	0	0	0.00	0.00	1.5	1.5	18	3	0
Gristmill 8	600	0	0	0.00	0.00	0.5	0.5	17	3	3
Gristmill Trans A	800	0	0	0.00	0.00	1.5	0.5	16.5	3	0
Gristmill Total	**5450**	**0**	**0**	**0.00**	**0.00**	**1.39**	**1.22**	**17.50**	**2.56**	**2.11**

Goethe 1	600	0	0	0.00	0.00	2.5	0.5	15.5	1	6
Goethe 2	600	0	0	0.00	0.00	3.5	0.5	15.5	1	7
Goethe 2a	600	0	0	0.00	0.00	4.5	0.5	15.5	1	0
Goethe 3	600	0	0	0.00	0.00	0.5	1.5	15.5	3	0
Goethe 4	600	0	0	0.00	0.00	0.5	0.5	15.5	2	5
Goethe 5	600	0	0	0.00	0.00	0.5	1	15.5	4	3
Goethe 5a	900	0	3	0.00	0.00	1.5	2.5	15.5	6	0
Goethe 6	480	0	1	0.00	0.00	4.5	1.5	15.5	4	0
Goethe Total	**4980**	**0**	**4**	**0.00**	**0.00**	**2.25**	**1.06**	**15.50**	**2.75**	**2.63**

Rossmoor 1	600	0	0	0.00	0.00	2.5	1.5	15	3	0
Rossmoor 2	600	0	0	0.00	0.00	0.5	0.5	15	-	0
Rossmoor 3	600	0	0	0.00	0.00	1.5	0.5	15	3	3
Rossmoor 3A	450	0	0	0.00	0.00	1.5	0.5	15	1	7
Rossmoor 4	800	0	0	0.00	0.00	0.5	0.5	15	-	0
Rossmoor 5	900	0	0	0.00	0.00	4.5	0.5	15	1	4
Rossmoor 6	450	0	0	0.00	0.00	1.5	0.5	15	3	0
Rossmoor 7	480	0	0	0.00	0.00	0.5	0.5	15	3	0
Rossmoor 8	480	0	0	0.00	0.00	1.5	0.5	15	2	5
Rossmoor A	600	0	0	0.00	0.00	0.5	0.5	15	3	0
Rossmoor Total	**5960**	**0**	**0**	**0.00**	**0.00**	**1.50**	**0.60**	**15.00**	**2.38**	**1.90**

Lower Sunrise 1										
Lower Sunrise 2	600	0	0	0.00	0.00	9	0.5	17	1	9
Lower Sunrise 3	600	0	0	0.00	0.00	1.5	0.5	18	1	0
Lower Sunrise 4	600	0	0	0.00	0.00	35	1.5	17	3	9
Lower Sunrise 5	600	11	60	0.02	0.10	2.5	1.5	15	3	0
Lower Sunrise 6	600	0	0	0.00	0.00	0.5	0.5	16	3	0
Lower Sunrise 7	600	0	0	0.00	0.00	0.5	0.5	15	3	0
Lower Sunrise 8	1600	0	0	0.00	0.00	5.5	1.5	15	3	0
Lower Sunrise To	**5200**	**11**	**60**	**0.00**	**0.01**	**7.79**	**0.93**	**16.14**	**2.43**	**2.57**

Upper Sunrise 1	600	0	0	0.00	0.00	1.5	0.5	15.5	2	6
Upper Sunrise 2	600	0	23	0.00	0.04	1.5	1	15.5	1	3
Upper Sunrise 3	600	0	0	0.00	0.00	0.5	1.5	17	3	0
Upper Sunrise 4	600	0	0	0.00	0.00	0.5	1.5	17	3	0
Upper Sunrise 4A	640	0	0	0.00	0.00	0.5	0.5	16	3	0
Upper Sunrise 5	600	0	0	0.00	0.00	1.5	0.5	15	3	6
Upper Sunrise 6	600	0	0	0.00	0.00	0.5	0.5	15	3	0
Upper Sunrise 7	600	0	0	0.00	0.00	0.5	0.5	15	3	0
Upper Sunrise 8	600	0	0	0.00	0.00	4.5	0.5	16	6	0
Upper Sunrise 9	600	0	1	0.00	0.00	9.5	0.5	16	6	0
Upper Sunrise 10	480	0	30	0.00	0.06	5.5	0.5	16	6	5
Upper Sunrise 11	900	0	0	0.00	0.00	7.5	1.5	16	3	0
Upper Sunrise 12	900	0	1	0.00	0.00	1.5	1.5	15	3	0
Upper Sunrise Tot	**8320**	**0**	**55**	**0.00**	**0.01**	**2.73**	**0.85**	**15.77**	**3.46**	**1.54**

Sailor lower 1	450	3	0	0.01	0.00	9	0.5	16	1	7
Sailor lower 2	450	0	0	0.00	0.00	3.5	0.5	16	6	5
Sailor lower 3	600	0	0	0.00	0.00	0.5	0.5	17	3	0
Sailor lower 4	600	0	0	0.00	0.00	0.5	0.5	16	1	0
Sailor lower 5	900	0	0	0.00	0.00	2.5	1.5	16	3	0
Sailor lower 6	600	0	0	0.00	0.00	2.5	1.5	16	6	0
Sailor lower 7	450	0	0	0.00	0.00	1.5	1.5	16	3	0
Sailor lower 8	600	0	0	0.00	0.00	0.5	0.5	15	3	0
Sailor lower 9	600	0	0	0.00	0.00	0.5	0.5	16.5	3	6
Sailor lower 10	600	0	0	0.00	0.00	0.5	0.5	14.5	3	0
Sailor lower 11	600	0	0	0.00	0.00	2.5	0.5	14.5	3	6
Sailor lower 12	600	0	0	0.00	0.00	2.5	0.5	14.5	1	8
sailor lower t/a	900	0	2	0.00	0.00	3.5	1.5	14.5	4	0
Sailor Lower Tota	**7950**	**3**	**2**	**0.00**	**0.00**	**2.31**	**0.81**	**15.58**	**3.08**	**2.46**

Sailor upper 1	600	0	0	0.00	0.00	0.5	0.5	14	4	4
Sailor upper 2	600	0	0	0.00	0.00	1.5	1.5	14	3	3
Sailor upper 3	600	0	6	0.00	0.01	4.5	0.5	14	3	0
Sailor upper 4	600	0	0	0.00	0.00	2.5	1.5	14	3	0
sailor upper 4aa	not sampled									
Sailor upper 5	600	0	0	0.00	0.00	0.5	0.5	17	1	0
Sailor upper 6	600	0	0	0.00	0.00	0.5	0.5	15.5	3	0
Sailor upper 6a	600	0	0	0.00	0.00	0.5	0.5	16	4	0
Sailor upper 7	600	0	0	0.00	0.00	2.5	0.5	16	1	0
Sailor upper 8	600	0	0	0.00	0.00	1.5	0.5	16	3	6
Sailor upper 9	1500	0	0	0.00	0.00	4.5	0.5	17	3	0
Sailor upper 9a	600	0	0	0.00	0.00	4.5	0.5	16	3	0
sailor upper 10										
trans a	900	0	0	0.00	0.00	2.5	0.5	18	1	0
Sailor Upper Total	**8400**	**0**	**6**	**0.00**	**0.00**	**2.17**	**0.67**	**15.63**	**2.67**	**1.08**

Nimbus 1	450	0	0	0.00	0.00	3.5	0.5	16	1	5
Nimbus 2	480	0	0	0.00	0.00	7	0.5	16	1	0
Nimbus 3	600	0	0	0.00	0.00	0	0.5	16.5	1	0
Nimbus 4	600	0	0	0.00	0.00	0	0.5	16	1	0
Nimbus 5	600	0	0	0.00	0.00	0	0.5	16	1	0
Nimbus 5a	450	0	0	0.00	0.00	0.5	0.5	15	3	0
Nimbus 5b	450	0	0	0.00	0.00	0.5	0.5	14.5	3	0
Nimbus 6	900	0	0	0.00	0.00	7.5	0.5	16	3	0
Nimbus 7	450	0	0	0.00	0.00	0.5	0.5	14.5	3	0
Nimbus 7a	600	0	3	0.00	0.01	1.5	1	14	3	0
Nimbus 8	600	0	3	0.00	0.01	1.5	1	14	6	4
Nimbus 9	900	0	5	0.00	0.01	6.5	1.5	14	3	0
Nimbus Total	**7080**	**0**	**11**	**0.00**	**0.00**	**2.42**	**0.67**	**15.21**	**2.42**	**0.75**

Appendix C: Sampling Locations and Polygons.

Watt

Plate A4-1. Sampling units at Watt site.

Gristmill

Plate A5-1. Sampling units at Gristmill site.

Goethe

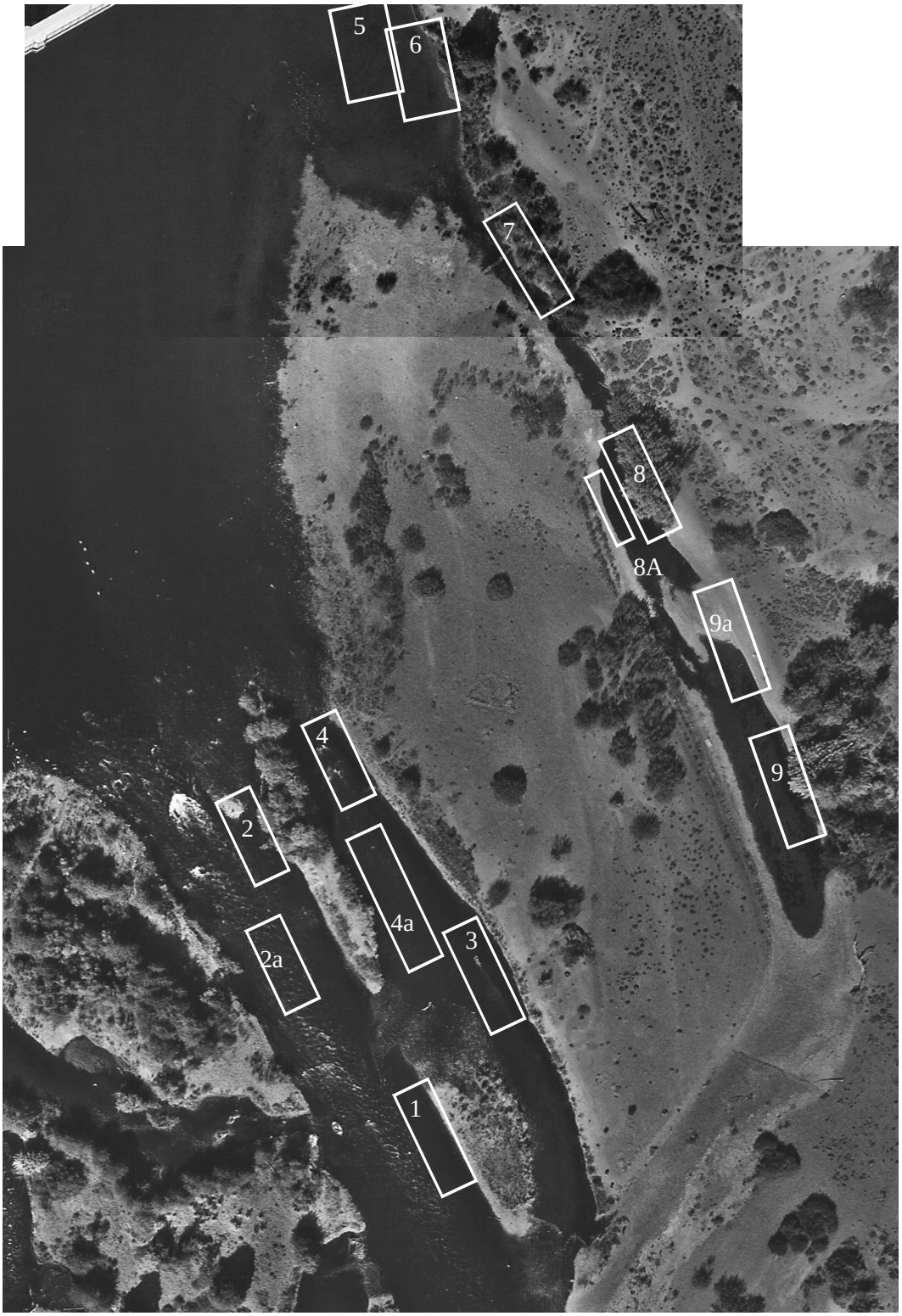


Plate A6-1. Sampling units at Goethe site. Note side channel at right was watered and fully connected all of the 2003 sampling season.

Rossmore

Plate A7-1. Sampling units at Rossmore site. Note salmon redds (lighter blotches) adjacent to and downstream of gravel pad placements at boat launch site.

Lower Sunrise

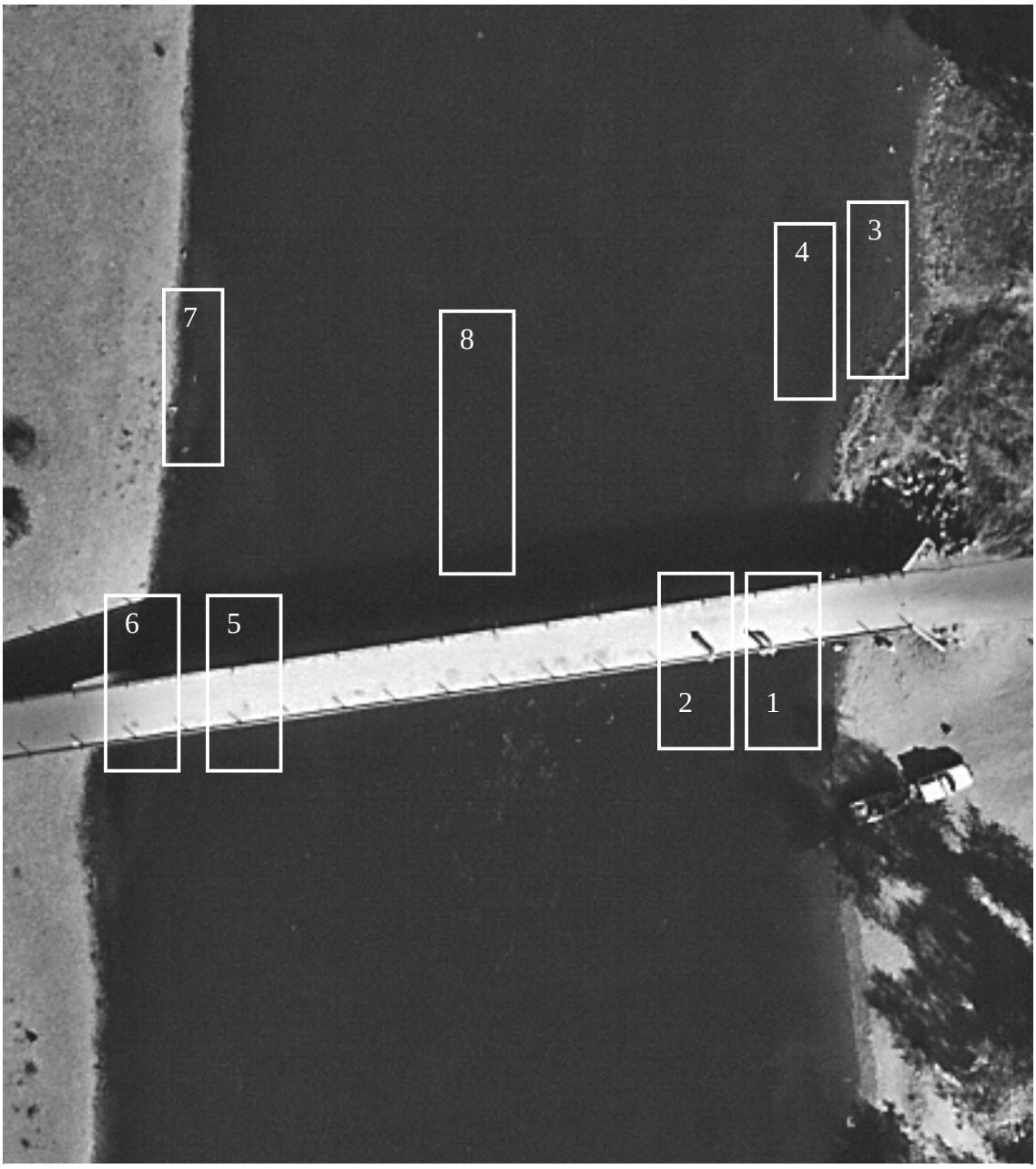


Plate A8-1. Sampling units at Lower Sunrise Site.

Upper Sunrise

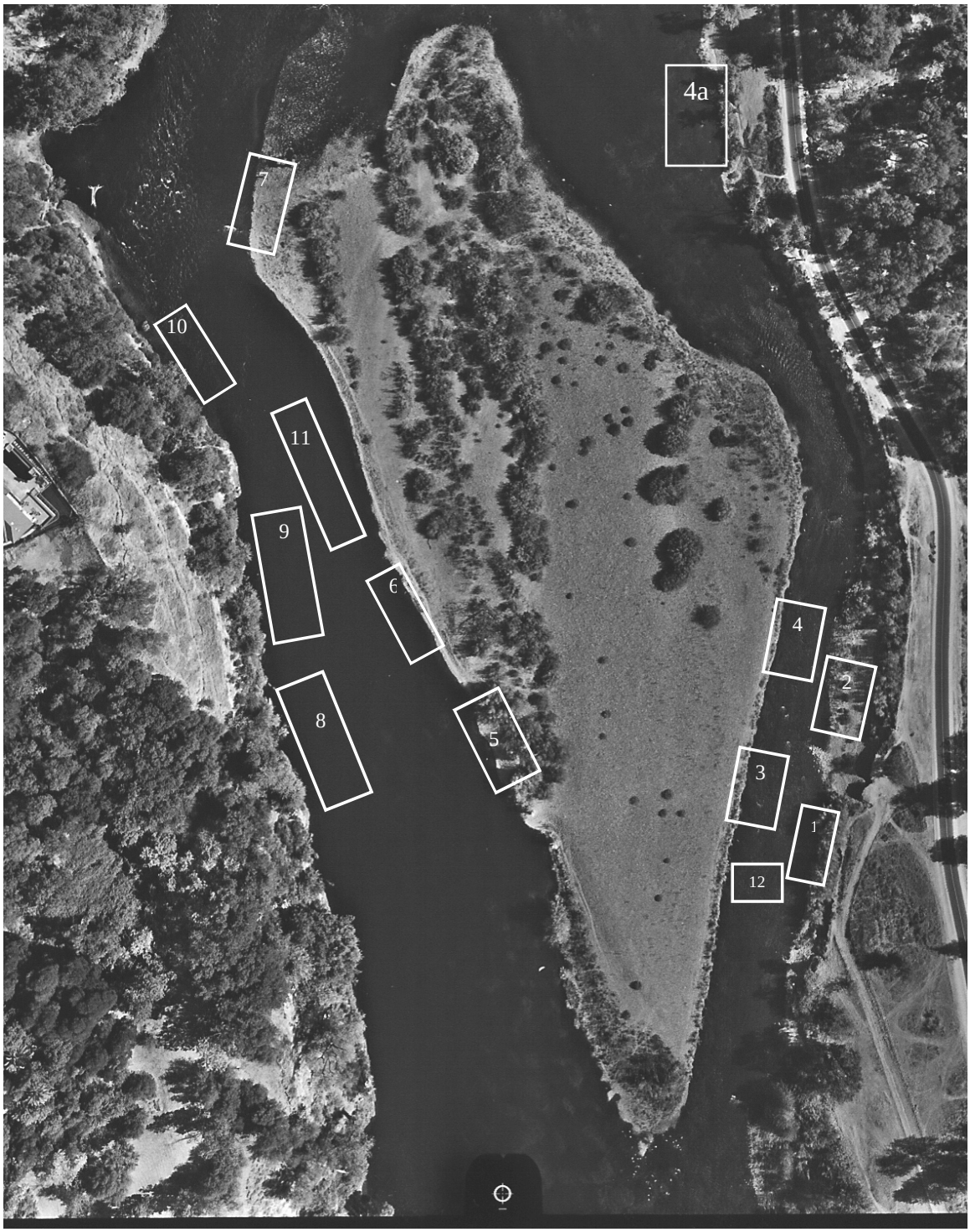


Plate A9-1. Sampling units at Upper Sunrise Site.

Lower Sailor Bar

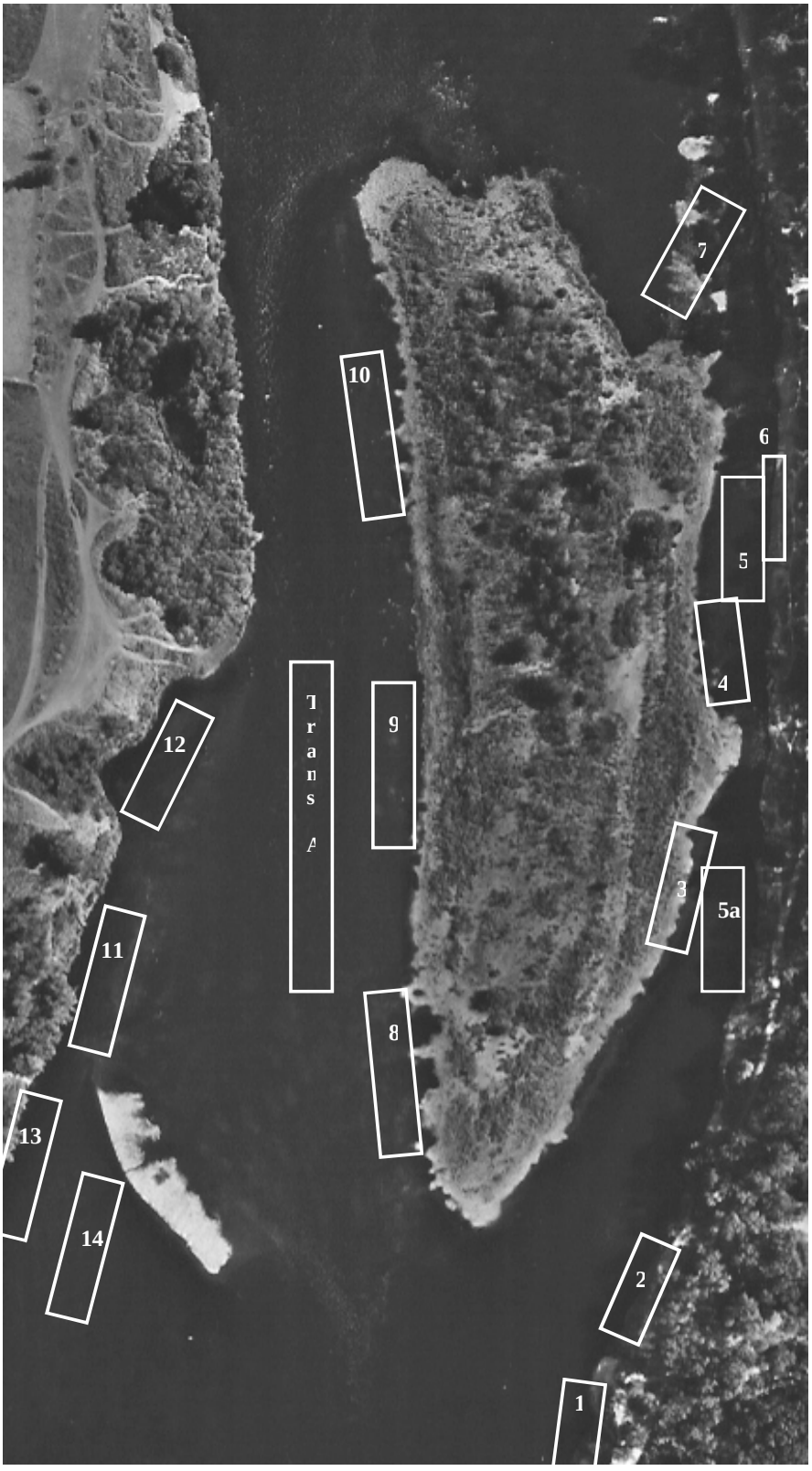


Plate A10-1. Sampling units at lower Sailor Bar Site.

Upper Sailor Bar

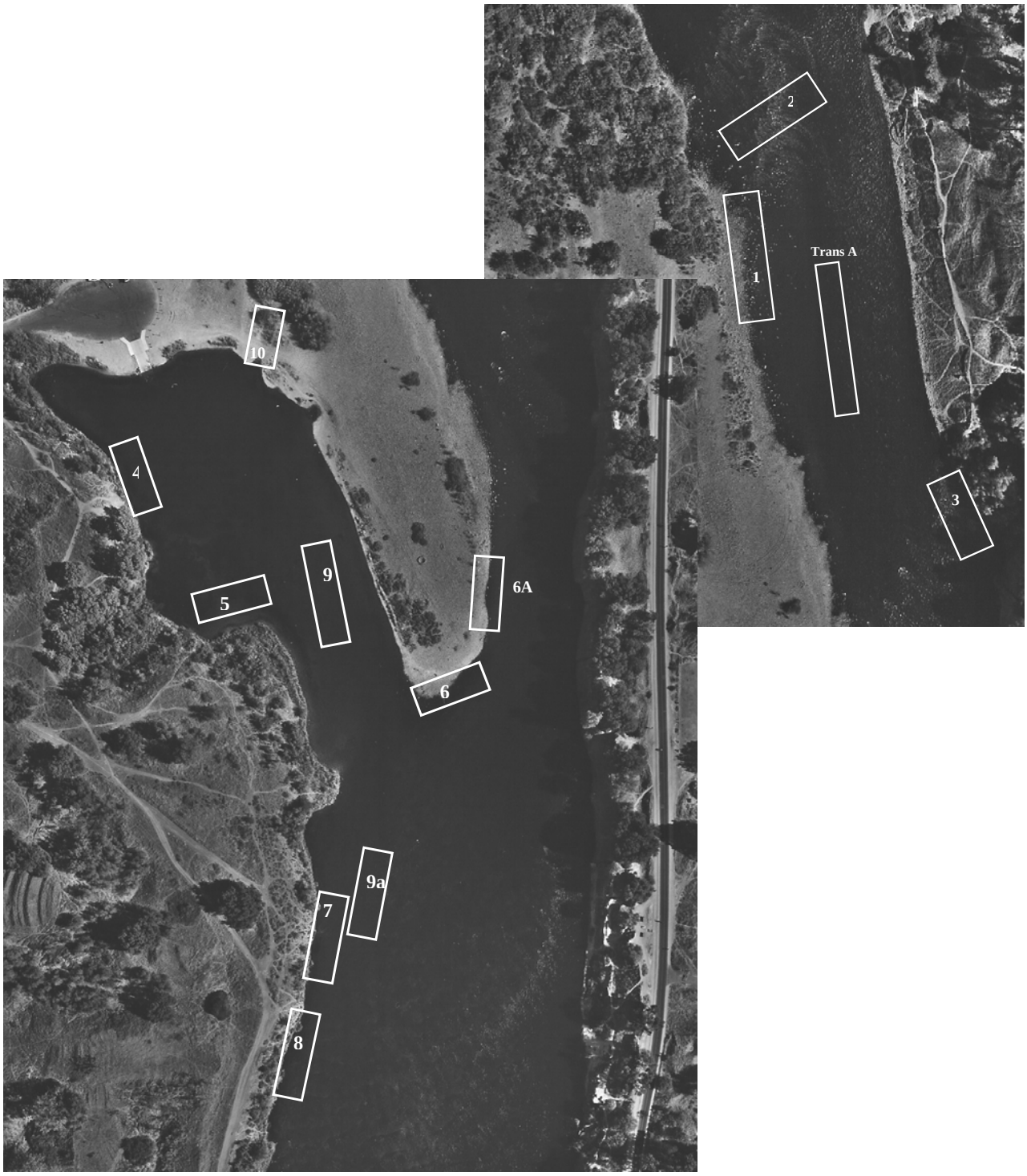


Plate A11-1. Upper Sailor Bar sampling units.

Nimbus Basin

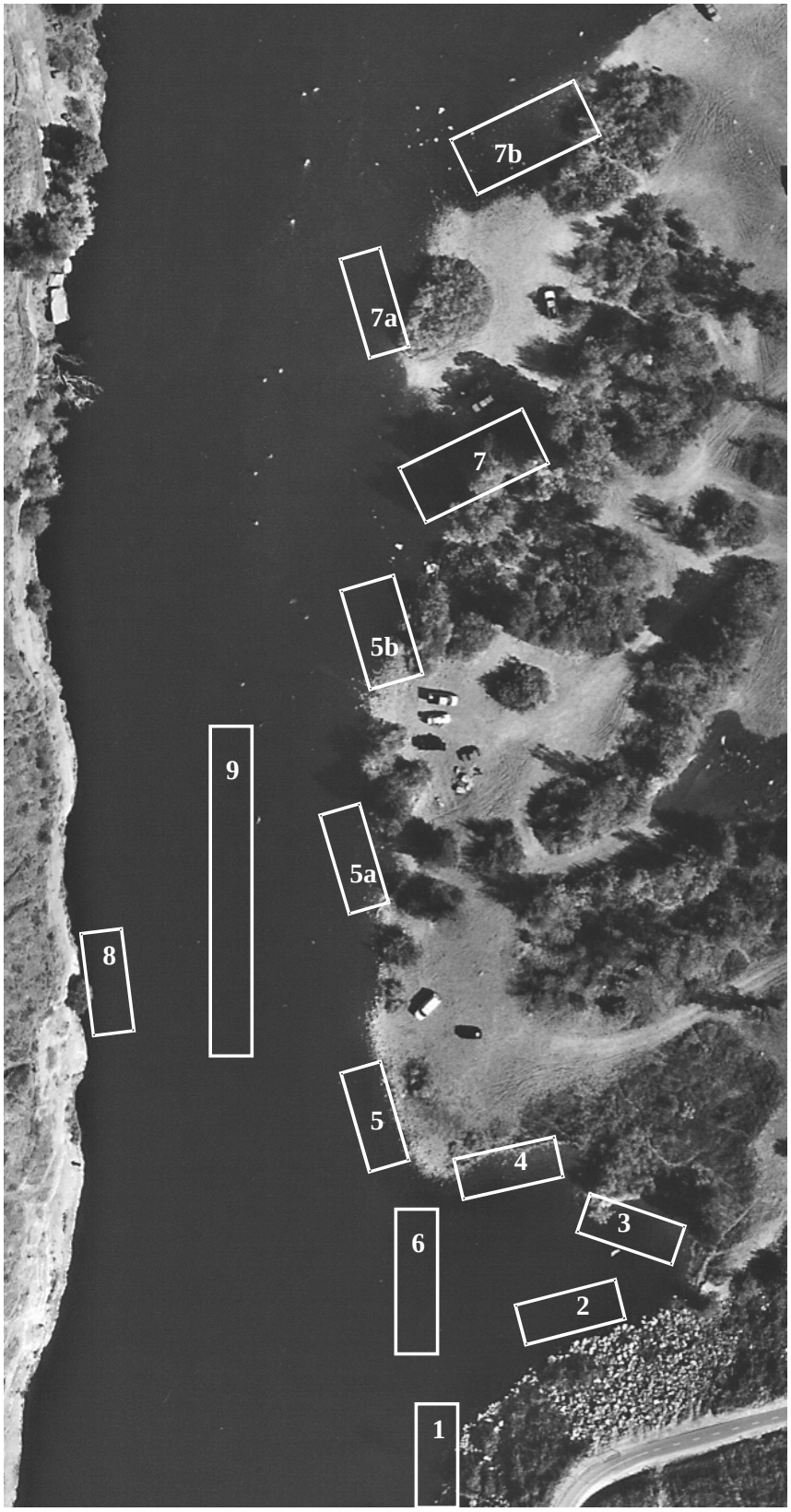


Plate A12-1. Sampling units in Nimbus Basin.